Astro

VOLUME 22 / NUMBER 4
FEBRUARY 23, 1984
ACC. NOS. N84-13136 TO N84-14108

APR 4 - 1984

The University of Michigan Astronomy Library

ASTRONOMY
TL
501
.S42
V.22
NO4

STAR
AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts*.

- You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available postpaid on subscription and in single copy from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, United States of America.

Semimonthly issues...

Annual subscription rates: $90.00 domestic; $112.00 foreign. Price per single copy: $4.75 domestic; $5.95 foreign.

Annual index issues...

Pricing based upon pagination.

Domestic subscription rates...

Apply to the United States, Canada, Mexico, and all Central and South American countries, except as noted below.

Foreign subscription rates...

Apply to Argentina, Brazil, French Guiana, Guyana, Surinam, Belize, and all other countries throughout the world.

Payment should be by check, money order, or document coupons, and must accompany order. Remittances from foreign countries should be made by international money order or draft on an American bank, payable to the Superintendent of Documents, or by UNESCO book coupons.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 22, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through February 28, 1985.

US ISSN 0036-8741

INTRODUCTION

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR*, and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NAS Scientific and Technical Information System ... and How to Use It*, available without charge from t NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 2124

HOW TO USE *STAR* SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category/division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche(1) are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Adminstration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its' Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

Avail: ESDU. Pricing information on specific data items, computer programs, and details on ESDU topic categories can be obtained from ESDU International Ltd. Requesters in North America should use the Virginia address while all other requesters should use the London address, both of which are on page vi.

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02 ($7.00 domestic; $14.00 foreign). Microfiche are sold at price code A01 ($4.50 domestic; $9.00 foreign). The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
ATTN: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF *STAR* ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $60.00 North America; $120.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

ESDU International, Ltd.
1495 Chain Bridge Road
McLean, Virginia 22101

ESDU International, Ltd.
251-259 Regent Street
London, W1R 7AD, England

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NIT-1)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library
National Center – MS 950
12201 Sunrise Valley Drive
Reston, Virginia 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, Arizona 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS 914
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1983)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.50	$ 9.00
A02	001-025	7.00	14.00
A03	026-050	8.50	17.00
A04	051-075	10.00	20.00
A05	076-100	11.50	23.00
A06	101-125	13.00	26.00
A07	126-150	14.50	29.00
A08	151-175	16.00	32.00
A09	176-200	17.50	35.00
A10	201-225	19.00	38.00
A11	226-250	20.50	41.00
A12	251-275	22.00	44.00
A13	276-300	23.50	47.00
A14	301-325	25.00	50.00
A15	326-350	26.50	53.00
A16	351-375	28.00	56.00
A17	376-400	29.50	59.00
A18	401-425	31.00	62.00
A19	426-450	32.50	65.00
A20	451-475	34.00	68.00
A21	476-500	35.50	71.00
A22	501-525	37.00	74.00
A23	526-550	38.50	77.00
A24	551-575	40.00	80.00
A25	576-600	41.50	83.00
A99	601-up	-1	-2

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	35.00	45.00

VOLUME 22 NUMBER 4/FEBRUARY 23, 1984

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) **477**

02 AERODYNAMICS **478**

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*

03 AIR TRANSPORTATION AND SAFETY **481**

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION **482**

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications*.

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE **482**

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

06 AIRCRAFT INSTRUMENTATION **484**

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

07 AIRCRAFT PROPULSION AND POWER **485**

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

08 AIRCRAFT STABILITY AND CONTROL **487**

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) **487**

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space)*.

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

12 ASTRONAUTICS (GENERAL) **488**

For extraterrestrial exploration see *91 Lunar and Planetary Exploration*.

13 ASTRODYNAMICS **488**

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) **489**

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air)*.

15 LAUNCH VEHICLES AND SPACE VEHICLES **489**

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION **490**

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation*.

17 SPACECRAFT COMMUNICATION, COMMAND AND TRACKING **N.A.**

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications*.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE **N.A.**

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

19 SPACECRAFT INSTRUMENTATION **N.A.**

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

20 SPACECRAFT PROPULSION AND POWER **490**

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) 491
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS 491
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY 492
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics*.

26 METALLIC MATERIALS 497
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 505
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS 508
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power*, *20 Spacecraft Propulsion and Power*, and *44 Energy Production and Conversion*.

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics*.

31 ENGINEERING (GENERAL) 510
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS 517
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking*.

33 ELECTRONICS AND ELECTRICAL ENGINEERING 524
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

34 FLUID MECHANICS AND HEAT TRANSFER 530
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

35 INSTRUMENTATION AND PHOTOGRAPHY 537
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation*.

36 LASERS AND MASERS 539
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING 543
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY 545
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 547
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences*.

42 GEOSCIENCES (GENERAL) 550

43 EARTH RESOURCES 551
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography*.

44 ENERGY PRODUCTION AND CONVERSION 557
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power*, *20 Spacecraft Propulsion and Power*, *28 Propellants and Fuels*, and *85 Urban Technology and Transportation*.

45 ENVIRONMENT POLLUTION 559
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS 561
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation*.

47 METEOROLOGY AND CLIMATOLOGY 565
Includes weather forecasting and modification.

48 OCEANOGRAPHY 569
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) **570**
Includes genetics.

52 AEROSPACE MEDICINE **572**
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES **573**
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT **574**
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY **N.A.**
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) **575**

60 COMPUTER OPERATIONS AND HARDWARE **577**
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE **578**
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS **584**
Includes computer networks.

63 CYBERNETICS **585**
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS **586**
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY **591**
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS **592**
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS **592**
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

70 PHYSICS (GENERAL) **593**
For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar Physics.*

71 ACOUSTICS **594**
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution.*

72 ATOMIC AND MOLECULAR PHYSICS **596**
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS **602**
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

74 OPTICS **604**
Includes light phenomena.

75 PLASMA PHYSICS **605**
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS **611**
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS **615**
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) **N.A.**
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT **615**
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE **616**
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS **617**
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **N.A.**
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **617**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **N.A.**

89 ASTRONOMY **617**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **619**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **621**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **621**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **622**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

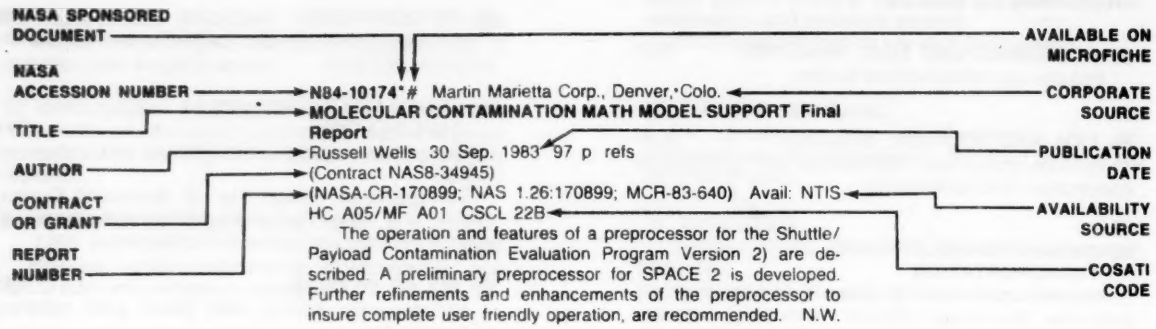
GENERAL

99 GENERAL **623**

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX **I-1**
PERSONAL AUTHOR INDEX **I-53**
CORPORATE SOURCE INDEX **I-61**
CONTRACT NUMBER INDEX **I-73**
REPORT/ACCESSION NUMBER INDEX **I-77**

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
NASA ACCESSION NUMBER
TITLE
AUTHOR
CONTRACT OR GRANT
REPORT NUMBER
AVAILABLE ON MICROFICHE
CORPORATE SOURCE
PUBLICATION DATE
AVAILABILITY SOURCE
COSATI CODE
N84-10174*# Martin Marietta Corp., Denver, Colo.
MOLECULAR CONTAMINATION MATH MODEL SUPPORT Final Report
Russell Wells 30 Sep. 1983 97 p refs
(Contract NAS8-34945)
(NASA-CR-170899; NAS 1.26:170899; MCR-83-640) Avail: NTIS HC A05/MF A01 CSCL 22B
The operation and features of a preprocessor for the Shuttle/Payload Contamination Evaluation Program Version 2) are described. A preliminary preprocessor for SPACE 2 is developed. Further refinements and enhancements of the preprocessor to insure complete user friendly operation, are recommended. N.W.

VOLUME 22 NUMBER 4/FEBRUARY 23, 1984

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N84-13136*# National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING, A CONTINUING BIBLIOGRAPHY WITH INDEXES
Dec. 1983 98 p
(NASA-SP-7037(168); NAS 1.21:7037(168)) Avail: NTIS HC $5.00 CSCL 01A

This bibliography lists 352 reports, articles and other documents introduced into the NASA scientific and technical information system in November 1983. E.A.K.

N84-13137*# National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 167)
Jan. 1983 144 p
(NASA-SP-7037(167); NAS 1.21:7037(167)) Avail: NTIS HC $5.00/MF A01 CSCL 01A

This bibliography lists 530 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1983. Author

N84-13138*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN OVERVIEW OF AERODYNAMIC RESEARCH AND TECHNOLOGY REQUIREMENTS AS RELATED TO SOME MILITARY NEEDS
M. Leroy Spearman Nov. 1983 15 p refs
(NASA-TM-85691; NAS 1.15:85691) Avail: NTIS HC A02/MF A01 CSCL 01B

Based on unclassified sources, a general review is presented of some military needs in light of the perceived U.S.S.R. doctrine, force balances, inventory growth, inventory items, and current actions. The Soviets appear to be attempting to increase their sphere of influence throught economic and political control as well as possible military control of land, sea, air, and space. To offset such possibilities, certain areas of deterrent needs that the Western World might pursue are suggested. Particular emphasis is placed on the role of research and technology related to aerospace systems as part of the deterrent needs. Author

N84-13139*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SOME THOUGHTS CONCERNING LARGE LOAD-CARRYING VEHICLES
M. Leroy Spearman Nov. 1983 25 p refs
(NASA-TM-85701; NAS 1.15:85701) Avail: NTIS HC A02/MF A01 CSCL 01C

Some implications relative to combat operations and force sustainability into the twenty-first century are discussed. The basic conjecture is that, sometime in the future, secure overseas basing may be denied to the United States by the Soviet Union or by unfriendly, unstable governments. In that event, the support of future battle itself, may be conducted from the continental U.S. and would introduce requirements for large, long-range, efficient, and sometimes, fast air vehicles. Some unusual design concepts and the technology requirements for such vehicles are suggested. It is concluded that, while much of the required technology is already being pursued, further advanced should be expected and sought in improved aerodynamics, propulsion, structures, and avionics with a view toward increased efficiency, utility, and affordability. Author

N84-13140*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A REAL-TIME IMPLEMENTATION OF AN ADVANCED SENSOR FAILURE DETECTION, ISOLATION, AND ACCOMMODATION ALGORITHM
John C. DeLaat and Walter C. Merrill Dec. 1983 12 p refs Presented at the 21st Aerospace Sci. Meeting, Reno, Nev., 9-12 Jan. 1984
(NASA-TM-83553; E-1928; NAS 1.15:83553) Avail: NTIS HC A02/MF A01 CSCL 01B

A sensor failure detection, isolation, and accommodation algorithm was developed which incorporates analytic sensor redundancy through software. This algorithm was implemented in a high level language on a microprocessor based controls computer. Parallel processing and state-of-the-art 16-bit microprocessors are used along with efficient programming practices to achieve real-time operation. Author

N84-13141# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE, BIOMONTHLY BULLETIN, NO. 1982-4, 209/JULY-AUGUST 1982
Claude Sevestre, ed. Paris ESA Dec. 1982 66 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris) No. 1982 Individual titles previcusly announced as A83-17315 through A83-17320
(ESA-TT-781; ONERA-1982-4) Avail: NTIS HC A04/MF A01; Original ENGLISH version available from ONERA, Paris FF 55; Original version in FRENCH available from ONERA, Paris

A simple subgrid scale stresses model with homogeneous isotropic turbulence, the aeroelasticity of helicopter rotors in forward flight, aerofoils and blade tips for helicopters, regular or catastrophic evolution of steady flows depending on parameters, a quadratic programming algorithm, and holographic interferometry by non-silver film process are discussed. N.W.

N84-13142# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE, BIMONTHLY BULLETIN, NO. 1982-5, 210/SEPTEMBER-OCTOBER 1982
Claude Savestre, ed. Feb. 1983 89 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris) No. 1982-5, 210/Sep.-Oct. 1982 Individual titles previously announced as A83-23676 through A83-23680

(ESA-TT-785; ONERA-1982-5) Avail: NTIS HC A05/MF A01; Original ENGLISH version available from ONERA, Paris FF-55, original FRENCH version available from ONERA, Paris

A hydrodynamic visualization laboratory, the influence of metallurgical factors on the fracture toughness of 7010 and 7050 aluminum alloys, electron beam energy branching in a gas mixture, aeroelastic equilibrium of a helicopter rotor with non-linear aerodynamic forces, and medium frequency linear vibrations of anisotropic elastic structure are discussed. N.W.

N84-13143# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE, BIMONTHLY BULLETIN, NO. 1982-2, 207/MARCH-APRIL 1982
Claude Sevestre, ed. Paris ESA Sep. 1982 90 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris) No. 1982-2, 207/Mar.-Apr. 1982 p 61-144 Individual titles previously announced as A82-42527 through A82-42532 Sponsored by ESA
(ESA-TT-759) Avail: NTIS HC A05/MF A01; Original version in ENGLISH available from ONERA, Paris FF 55; original report in FRENCH available from ONERA, Paris

Topics addressed include the following: control losses on combat aircraft; pressure distributions on a wing; model of ammonium perchlorate self-degradation; internal stress in viscoplasticity; proton induced X ray emission; cryogenic operation of TZ ONERA/CERT wind tunnel; and an integral equation method for solving the exterior incompressible fluid-structure coupled problem. For individual titles, see N84-13144 through N84-13145.

N84-13144# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
BIFURCATION THEORY APPLIED TO THE STUDY OF CONTROL LOSSES ON COMBAT AIRCRAFT c05
P. Guicheteau *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1982-2, 207 Mar.-Apr. 1982 (ESA-TT-759) Sep. 1982 p 1-14 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris) No. 1982-2, 207 Mar.-Apr. 1982 Presented at AGARD/FMP Symp. on Combat Aircraft Maneuverability, Florence, 5-8 Oct. 1981 (For primary document see N84-13143 04-01)
Avail: NTIS HC A05/MF A01

Aircraft motion is described by a set of nonlinear differential equations associating the state vector (angle of attack, sideslip angle, speed...) with the control vector (thrust, ailerons, rudder, elevator) through flight dynamics equations and the aerodynamic aircraft model. The method proposed consists in computing the stability boundaries of this set of equations and predicting its evolution when it becomes unstable. The bifurcation theory of nonlinear differential equations was used. Author

N84-13145# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
ANALYSIS OF PRESSURE DISTRIBUTIONS ON A WING WITH AN OSCILLATING TRAILING EDGE FLAP IN SUBSONIC AND TRANSONIC FLOW c02
H. Consigny *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1982-2, 207/Mar.-April 1982 (ESA-TT-759) Sep. 1982 p 15-33 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris) No. 1982-2, 207/Mar.-Apr. 1982 (For primary document see N84-13143 04-01)
Avail: NTIS HC A05/MF A01

The three dimensional unsteady effects of an oscillating part-span trailing-edge flap were studied. The experiments were performed on a constant chord (0.3 m) and constant thickness (16%) supercritical wing mounted on the side-wall of the 1.76 x 1.75 m S2 transonic wind tunnel. The model was fitted with some 238 static pressure taps and 136 small unsteady pressure transducers (Kulite) located at several spanwise stations. Extensive information on the influence of various parameters on both steady and unsteady chordwise pressure distributions and aerodynamic coefficients (normal force, pitching moment, hinge moment) were provided. The experimental oscillatory pressures and aerodynamic coefficients were also compared with those obtained by calculations based on the solution of the classical unsteady transonic small disturbances (TSD) form of the three dimensional potential equation. The extent to which this method is capable of reproducing the influence of the various parameters experimentally observed was examined. The experimental data obtained over a wide range of parameters turned out to be particularly useful in determining the practical limits of such a theoretical approach. Author

N84-13146# Army Test and Evaluation Command, Aberdeen Proving Ground, Md.
INTEGRATED LOGISTIC SUPPORTABILITY (AVIATION MATERIEL) Final Report
1 Sep. 1983 43 p
(AD-A132367; TOP-7-3-507) Avail: NTIS HC A03/MF A01 CSCL 15/5

This TOP(Test Operations Procedures) presents a systematic method for conducting an integrated logistic supportability test in the developmental test environment. Subelements of the logistic supportability test covered by this TOP are: End item requirement; Supply support; Technical data/equipment publication; Support and test equipment; Manpower and personnel, training, and training devices; Transportation and Handling; and Facilities. Author (GRA)

N84-13147# Federal Aviation Agency, Washington, D.C. Information and Statistics Div.
CENSUS OF US CIVIL AIRCRAFT Annual Report
31 Dec. 1982 307 p Sponsored in part by the FHA
(PB83-252460; FAA-AMS-220) Avail: NTIS HC A14/MF A01 CSCL 01C

Information about the U.S. civil aircraft fleet is presented. Tables of air carrier aircraft are included as well as an iventory of registered aircraft by manufacturer and model. General aviation aircraft are listed by state and county of the owner. GRA

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N84-13148 Washington Univ., Seattle.
INVESTIGATION OF AXISYMMETRIC CONFINED TURBULENT JET MIXING IN THE NEAR REGION WITH ADVERSE PRESSURE GRADIENT Ph.D. Thesis
Dong Whan Choi 1983 328 p
Avail: Univ. Microfilms Order No. DA8312129

The mixing of a subsonic confined coaxial jet with a secondary air stream is described both analytically and experimentally. Emphasis is placed on the potential core region, turbulent boundary layer - mixing layer interaction, and the effect of adverse pressure gradient on the mixing. In the experimental approach, the flow is investigated from the inlet where the jet and secondary velocities are uniform to a location downstream where the flow energies to a transition region. In the analytical approach, an appropriate turbulence model is developed, the matching condition of a boundary layer and a mixing layer is considered, and sets of numerical solutions obtained by using an implicit finite difference technique are described. It was found that the radial turbulent normal stress is much higher by 1.2 times than the longitudinal one in the initial mixing region and the detailed information regarding to pressure distributions and streamline distributions in the wake region and in the early mixing region is deduced. Dissert. Abstr.

N84-13149*# Georgia Inst. of Tech., Atlanta.
A VISCOUS-INVISCID INTERACTIVE PROCEDURE FOR ROTATIONAL FLOW IN CASCADES OF TWO DIMENSIONAL AIRFOILS OF ARBITRARY SHAPE Final Report, 15 Mar. 1979 - 13 Aug. 1982
William A. Johnston 1983 65 p refs
(Grant NsG-3260)

(NASA-CR-174609; NAS 1.26:174609) Avail: NTIS HC A04/MF A01

A viscous-inviscid interactive calculation procedure is developed for application to flow in cascades of two-dimensional airfoils. This procedure has essentially three components. First, a numerical solution of the Eules equations which can accomodate an arbitrarily specified cascade geometry is carried out on a nonorthogonal curvilinear grid mesh that is fitted to the geometry of the cascade. A method of grid generation has been used which relies in part on a succession of conformal mappings. Second, a viscous solution for use in boundary layers and wake regions was programmed. Finally, an interactive scheme which takes the form of a source-sink distribution along the blade surface and wake centerline is employed. Results were obtained with this procedure for several cascade flow situations, and some comparisons with experiment are presented. Author

N84-13150*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

XTRAN2L: A PROGRAM FOR SOLVING THE GENERAL-FREQUENCY UNSTEADY TRANSONIC SMALL DISTURBANCE EQUATION

Woodrow Whitlow, Jr. Nov. 1983 29 p refs

(NASA-TM-85723; NAS 1.15:85723) Avail: NTIS HC A03/MF A01 CSCL 01A

A program, XTRAN2L, for solving the general-frequency unsteady transonic small disturbance potential equation was developed. It is a modification of the LTRAN2-NLR code. The alternating-direction-implicit (ADI) method of Rizzetta and Chin is used to advance solutions of the potential equation in time Engquist-Osher monotone spatial differencing is used in the ADI solution algorithm. As a result, the XTRAN2L code is more robust and more efficient than similar codes that use Murman-Cole type-dependent spatial differencing. Nonreflecting boundary conditions that are consistent with the general-frequency equation have been developed and implemented at the far-field boundaries. Use of those conditions allow the computational boundaries to be moved closer to the airfoil with no loss of accuracy. This makes the XTRAN2L code more economical to use. Author

N84-13151*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

TABULATION OF DATA FROM TESTS OF AN NPL 9510 AIRFOIL IN THE LANGLEY 0.3-METER TRANSONIC CRYOGENIC TUNNEL

Renaldo V. Jenkins Nov. 1983 237 p refs

(NASA-TM-84579; NAS 1.15:84579) Avail: NTIS HC A11/MF A01 CSCL 01A

The tabulated data from tests of a six inch chord NPL 9510 airfoil in the Langley 0.3-Meter Transonic Cryogenic Tunnel. The tests were performed over the following range of conditions: Mach numbers of 0.35 to 0.82, total temperature of 94 K to 300 K, total pressure of 1.20 to 5.81 atm, Reynolds number based on chord of 1.34 x 10 to the 6th to 48.23 x 10 to the 6th, and angle of attack of 0 deg to 6 deg. The NPL 9510 airfoil was observed to have decreasing drag coefficient up to the highest test Reynolds number. Author

N84-13152*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

INVESTIGATION OF INSTALLATION EFFECTS ON TWIN-ENGINE CONVERGENT-DIVERGENT NOZZLES

E. Ann Bare and Bobby L. Berrier Nov. 1983 191 p refs

(NASA-TP-2205; L-15609; NAS 1.60:2205) Avail: NTIS HC A09/MF A01 CSCL 01A

An investigation was conducted in the Langley 16-Foot Transonic Tunnel to determine installation effects on convergent-divergent nozzles applicable to twin-engine reduced-power supersonic cruise aircraft. Tests were conducted at Mach numbers from 0.50 to 1.20, angles of attack from -5 deg to 9 deg, and at nozzle pressure ratios from jet off (1.0) to 8.0. The effects of empennage arrangement, nozzle length, and afterbody closure on total and component drag coefficients were investigated. Author

N84-13153*# Boeing Commercial Airplane Co., Seattle, Wash.

SPECIFICATION FOR A PROGRAM FOR AN INTERATIVE AEROELASTIC SOLUTION (PIAS)

Marjorie E. Manro, Michael J. Donahue, Rodney L. Dreisbach, and John E. Bussoletti Dec. 1983 99 p refs

(Contract NAS1-16740)

(NASA-CR-172200; NAS 1.26:172200; D6-52134) Avail: NTIS HC A05/MF A01 CSCL 01A

An engineering and software specification which was written for a computer program to calculate aeroelastic structural loads including the effects of nonlinear aerodynamics is presented. The procedure used in the program for an iterative aeroelastic solution (PIAS) is to alternately execute two computer codes: one to calculate aerodynamic loads for a specific wing shape, and another to calculate the deflected shape caused by this loading. A significant advantage to the design of PIAS is that the initial aerodynamic module can be replaced with others. The leading edge vortex (LEV) program is used as the aerodynamic module in PIAS. This provides the capability to calculate aeroelastic loads, including the effects of a separation induced leading edge vortex. The finite element method available in ATLAS integrated structural analysis and design system is used to determine the deflected wing shape for the applied aerodynamics and inertia loads. The data management capabilities in ATLAS are used by the execution control monitor (ECM) of PIAS to control the solution process. E.A.K.

N84-13154# National Aerospace Lab., Tokyo (Japan).

AN APPROXIMATE METHOD OF ESTIMATING THE AERODYNAMIC INTERFERENCE BETWEEN TWO PARALLEL BODIES (NORMAL FORCE AND SIDE FORCE)

Hirofumi Kondo 1983 17 p refs In JAPANESE; ENGLISH summary

(NAL-TR-752; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

The present study deals with an approximate method of estimating the aerodynamic interference between two parallel bodies. Formulae are derived from the slender body theory. The formulae for calculating the normal force and side force on one body are obtained as functions of the bank angle and the relative distances between bodies. The results of the calculation are compared with those from wind tunnel tests and fairly good agreement is obtained in some restricted region. It is pointed out that the present method can easily be extended to a combination of more than two bodies. Author

N84-13155# Aeronautical Research Inst. of Sweden, Stockholm. Aerodynamics Dept.

DEVELOPMENT OF A COMPUTER CODE FOR A THREE-DIMENSIONAL HIGHER ORDER PANEL METHOD FOR SUBSONIC POTENTIAL FLOW

L. E. Eriksson 8 Jul. 1983 73 p refs

(FFA-138) Avail: NTIS HC A04/MF A01

A computer code for the computation of subsonic inviscid flow around wings and wing-body configurations was developed using the boundary integral method or panel method. The method is based on the idea of independent surface networks with piecewise linear source distributions and piecewise quadratic dipole distributions. The effect of surface curvature is included to make the overall approximation consistent. Several numerical tests and comparisons indicate that the method gives accurate and reliable results and that these results are insensitive to the surface discretization. Author

N84-13156# National Inst. for Aeronautics and Systems Technology, Pretoria (South Africa).

AN ANALYTICAL METHOD TO CALCULATE THE FLOW FIELD ABOUT BLUNT BODIES OF REVOLUTION AT INCIDENCE IN SUPERSONIC FREE STREAM FLOW

G. J. vandenBroek Oct. 1982 130 p refs

(CSIR-NIAST-82/72) Avail: NTIS HC A07/MF A01

An analytical method to calculate the shock shape, stand-off distance and flow field generated by a blunt body of revolution at incidence in supersonic free stream flow, is described. A time-

dependent finite-difference technique is used, in which the shock wave is treated as a moving discontinuity. The steady state pattern is established asymptotically. Author

N84-13157*# Stanford Univ., Calif.
ANALYTICAL MODEL OF ROTOR WAKE AERODYNAMICS IN GROUND EFFECT
Hossein-Ali Saberi Dec. 1983 96 p refs
(Grant NsG-2400)
(NASA-CR-166533; NAS 1.26:166533) Avail: NTIS HC A05/MF A01 CSCL 01A

The model and the computer program developed provides the velocity, location, and circulation of the tip vortices of a two-blade helicopter in and out of the ground effect. Comparison of the theoretical results with some experimental measurements for the location of the wake indicate that there is excellent accuracy in the vicinity of the rotor and fair amount of accuracy far from it. Having the location of the wake at all times enables us to compute the history of the velocity and the location of any point in the flow. The main goal of out study, induced velocity at the rotor, can also be calculated in addition to stream lines and streak lines. Since the wake location close to the rotor is known more accurately than at other places, the calculated induced velocity over the disc should be a good estimate of the real induced velocity, with the exception of the blade location, because each blade was replaced only by a vortex line. Because no experimental measurements of the wake close to the ground were available to us, quantitative evaluation of the theoretical wake was not possible. But qualitatively we have been able to show excellent agreement. Comparison of flow visualization with out results has indicated the location of the ground vortex is estimated excellently. Also the flow field in hover is well represented. Author

N84-13158*# Lockheed-Georgia Co., Marietta.
A GRID-EMBEDDING TRANSONIC FLOW ANALYSIS COMPUTER PROGRAM FOR WING/NACELLE CONFIGURATIONS Final Report
Essam H. Atta and Joseph Vadyak Nov. 1983 109 p refs
(Contract NAS2-11285)
(NASA-CR-166529; NAS 1.26:166529; LG83ER0164) Avail: NTIS HC A06/MF A01 CSCL 01A

An efficient grid-interfacing zonal algorithm was developed for computing the three-dimensional transonic flow field about wing/nacelle configurations. the algorithm uses the full-potential formulation and the AF2 approximate factorization scheme. The flow field solution is computed using a component-adaptive grid approach in which separate grids are employed for the individual components in the multi-component configuration, where each component grid is optimized for a particular geometry such as the wing or nacelle. The wing and nacelle component grids are allowed to overlap, and flow field information is transmitted from one grid to another through the overlap region using trivariate interpolation. This report represents a discussion of the computational methods used to generate both the wing and nacelle component grids, the technique used to interface the component grids, and the method used to obtain the inviscid flow solution. Computed results and correlations with experiment are presented. also presented are discussions on the organization of the wing grid generation (GRGEN3) and nacelle grid generation (NGRIDA) computer programs, the grid interface (LK) computer program, and the wing/nacelle flow solution (TWN) computer program. Descriptions of the respective subroutines, definitions of the required input parameters, a discussion on interpretation of the output, and the sample cases illustrating application of the analysis are provided for each of the four computer programs. Author

N84-13159*# Lockheed-Georgia Co., Marietta.
A COMPUTER PROGRAM FOR THE CALCULATION OF THREE-DIMENSIONAL TRANSONIC NACELLE/INLET FLOWFIELDS Final Report
Joseph Vadyak and Essam H. Atta Moffett Field, Calif. NASA. Ames Research Center Nov. 1983 102 p refs
(Contract NAS2-11285)
(NASA-CR-166528; NAS 1.26:166528; LG83ER0163) Avail: NTIS HC A06/MF A01 CSCL 01A

A highly efficient computer analysis was developed for predicting transonic nacelle/inlet flowfields. This algorithm can compute the three dimensional transonic flowfield about axisymmetric (or asymmetric) nacelle/inlet configurations at zero or nonzero incidence. The flowfield is determined by solving the full-potential equation in conservative form on a body-fitted curvilinear computational mesh. The difference equations are solved using the AF2 approximate factorization scheme. This report presents a discussion of the computational methods used to both generate the body-fitted curvilinear mesh and to obtain the inviscid flow solution. Computed results and correlations with existing methods and experiment are presented. Also presented are discussions on the organization of the grid generation (NGRIDA) computer program and the flow solution (NACELLE) computer program, descriptions of the respective subroutines, definitions of the required input parameters for both algorithms, a brief discussion on interpretation of the output, and sample cases to illustrate application of the analysis. Author

N84-13160*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
VORTEX FLAP FLOW REATTACHMENT LINE AND SUBSONIC LONGITUDINAL AERODYNAMIC DATA ON 50 DEG TO 74 DEG DELTA WINGS ON COMMON FUSELAGE
Neal T. Frank, Jarrett K. Huffman, and Thomas D. Johnson, Jr. (Kentron International, Inc.) Dec. 1983 59 p refs
(NASA-TM-84618; L-15702; NAS 1.26:84618) Avail: NTIS HC A04/MF A01 CSCL 01A

Positions of the primary vortex flow reattachment line and longitudinal aerodynamic data were obtained at Mach number 0.3 for a systematic series of vortex flaps on delta wing body configurations with leading edge sweeps of 50, 58, 66, and 74 deg. The investigation was performed to study the parametric effects of wing sweep, vortex flap geometry and deflection, canards, and trailing edge flaps on the location of the primary vortex reattachment line relative to the flap hinge line. The vortex reattachment line was located via surface oil flow photographs taken at selected angles of attack. Force and moment measurements were taken over an angle of attack range of -1 deg to 22 deg at zero sideslip angle for many configurations to further establish the data base and to assess the aforementioned parametric effects on longitudinal aerodynamics. Both the flow reattachment and aerodynamic data are presented. Author

N84-13161*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
INTERNAL PRESSURE DISTRIBUTIONS FOR A TWO-DIMENSIONAL THRUST-REVERSING NOZZLE OPERATING AT A FREE-STREAM MACH NUMBER OF ZERO
Lawrence E. Putnam and Edward G. Strong Dec. 1983 45 p refs
(NASA-TM-85655; L-15582; NAS 1.15:85655) Avail: NTIS HC A03/MF A01 CSCL 01A

An investigation was conducted in the static test facility of the Langley 16-Foot Transonic Tunnel to measure static pressure distributions inside a nonaxisymmetric thrust reversing nozzle. The tests were made at nozzle total pressures ranging from ambient to about eight times ambient pressure at a free stream Mach number of zero. Tabulated pressure data are presented. Author

N84-13162*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AERODYNAMIC FORCE MEASUREMENTS WITH A STRAIN-GAGE BALANCE IN A CRYOGENIC WIND TUNNEL
Richmond P. Boyden, William G. Johnson, Jr., and Alice T. Ferris Dec. 1983 43 p refs
(NASA-TP-2251; L-15685; NAS 1.60:2251) Avail: NTIS HC A03/MF A01 CSCL 01A

Aerodynamic force measurements on a generalized 75 deg delta wing model with sharp leading edges were made with a three component internal strain gage balance in a cryogenic wind

tunnel at stagnation temperatures of 300 K, 200 K, and 110 K. The feasibility of using a strain gage balance without thermal control in a cryogenic environment as well as the use of electrical resistance heaters, an insulator between the model and the balance, and a convection shield on the balance was investigated. Force and moment data on the delta wing model as measured by the balance are compared at the different temperatures while holding constant either the Reynolds number or the tunnel stagnation pressure. Tests were made at Mach numbers of 0.3 and 0.5 and at angles of attack up to 29 deg. The results indicate that it is feasible to acquire accurate force and moment data while operating at steady state thermal conditions in a cryogenic wind tunnel, either with or without electrical heaters on the balance. Within the limits of the balance accuracy, there were no apparent Reynolds number effects on the aerodynamic results for the delta wind model. Author

N84-13163*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

THRUST-INDUCED EFFECTS ON SUBSONIC LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A VECTORED-ENGINE-OVER-WING CONFIGURATION

P. Frank Quinto and John W. Paulson, Jr. Dec. 1983 56 p refs (NASA-TP-2228; L-15629; NAS 1.60:2228) Avail: NTIS HC A04/MF A01 CSCL 01A

An investigation was conducted in the Langley 4 by 7 Meter Tunnel of the thrust induced effects on the longitudinal aerodynamic characteristics of a vectored-engine-over-wing fighter aircraft. The investigation was conducted at Mach numbers from 0.14 to 0.17 over an angle-of-attack range from -2 deg to 26 deg. The major model variables were the spanwise blowing nozzle sweep angle and main nozzle vector angle along with trailing edge, flap deflections. The overall thrust coefficient (main and spanwise nozzles) was varied from 0 (jet off) to 2.0. The results indicate that the thrust-induced effects from the main nozzle alone were small and mainly due to boundary-layer control affecting a small area behind the nozzle. When the spanwise blowing nozzles were included, the induced effects were larger than the main nozzle alone and were due to both boundary layer control and induced circulation lift. No leading edge vortex effects were evident. Author

N84-13164*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AERODYNAMIC CHARACTERISTICS, INCLUDING EFFECT OF BODY SHAPE, OF A MACH 6 AIRCRAFT CONCEPT

Gregory D. Riebe Dec. 1983 32 p refs (NASA-TP-2235; L-15675; NAS 1.60:2235) Avail: NTIS HC A03/MF A01 CSCL 01A

Longitudinal aerodynamic characteristics for a hydrogen-fueled hypersonic transport concept at Mach 6 are presented. The model components consist of four bodies with identical longitudinal area distributions but different cross-sectional shapes and widths, a wing, horizontal and vertical tails, and a set of wing-mounted nacelles simulated by slid bodies on the wing upper surface. Lift-drag ratios were found to be only sightly affected by fuselage planform width or cross sectional shape. Relative distribution of fuselage volume above and below the wing was found to have an effect on the lift-drag ratio, with a higher lift drag ratio produced by the higher wing position. S.C.L.

N84-13165*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

EFFECT OF THRUST REVERSER OPERATION ON THE LATERAL-DIRECTIONAL CHARACTERISTICS OF A THREE-SURFACE F-15 MODEL AT TRANSONIC SPEEDS

E. Ann Bare and Odis C. Pendergraft, Jr. Dec. 1983 91 p refs (NASA-TP-2234; L-15648; NAS 1.60:2234) Avail: NTIS HC A05/MF A01 CSCL 01A

An investigation was conducted in the Langley 16 Foot Transonic Tunnel to determine the lateral directional aerodynamic characteristics of a fully metric 0.04 scale model of the F-15 three surface configuration (canards, horizontal tails) with twin two dimensional nozzles and twin axisymmetric nozzles installed. The effects of two dimensional nozzle in flight thrust reversing and rudder deflection were also determined. Test data were obtained at static conditions and at Mach numbers from 0.60 to 1.20 over an angle of attack range from -2 deg to 15 deg. Reynolds number varied from 2.6 million to 3.8 million. Angle of sideslip was set at approximately 0 deg and -5 deg for all configurations and at -10 deg for selected configurations. Author

N84-13166# Nielsen Engineering and Research, Inc., Mountain View, Calif.

TRISERVICE PROGRAM FOR EXTENDING MISSILE AERODYNAMIC DATA BASE AND PREDICTION PROGRAM USING RATIONAL MODELING Interim Report, 16 Jun. 1982 - 15 Jun. 1983

Michael J. Hemsch and Jack N. Nielsen Aug. 1983 81 p (Contract N00014-80-C-0700)
(AD-A132455; NEAR-TR-305; IR-3) Avail: NTIS HC A05/MF A01 CSCL 20/4

The work described in this report was accomplished during the third year of the Triservice program for extending the missile aerodynamic data base and incorporating the new data into the predictive program known as MISSILE. The work consisted of four aspects: support of the ongoing wind tunnel tests, preparation for processing the data to be incorporated into the data base, methods development, and code development. Author (GRA)

N84-13167# Naval Postgraduate School, Monterey, Calif.

AN EXPERIMENTAL INVESTIGATION INTO THE FOREBODY AND ENGINE INLET AIRFLOW CHARACTERISTICS OF A PHOTOGRAPHIC RECONNAISSANCE WINDOW PALLET ON THE RF/A-18 AIRCRAFT M.S. Thesis

Joseph William Poole Jun. 1983 88 p
(AD-A132271) Avail: NTIS HC A05/MF A01 CSCL 20/4

A 1/7 scale model of a Navy F/A-18 forebody was built and tested in the Naval Postgraduate School Aeronautics Department Windtunnel to determine and measure the airflow total pressure distribution at the two engine inlet faces. The lower nose of this scaled model was then modified to incorporate a photographic reconnaissance window pallet, capable of holding two camera sensors within the existing gun bay. The model was retested using the same pressure measurement parameters and compared with the base aircraft test run to determine the airflow changes entering the engine inlets caused by this nose modification. Tufting was used on the model in each case to facilitate flow visualization observations and photography. The results of this investigation show that the pallet design tested caused no change in the airflow entering the engine intake ducts at low aircraft airspeeds. GRA

N84-13145# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

ANALYSIS OF PRESSURE DISTRIBUTIONS ON A WING WITH AN OSCILLATING TRAILING EDGE FLAP IN SUBSONIC AND TRANSONIC FLOW

H. Consigny *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1982-2, 207/Mar.-April 1982 (ESA-TT-759) Sep. 1982 p 15-33 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris) No. 1982-2, 207/Mar.-Apr. 1982 (For primary document see N84-13143 04-01)
Avail: NTIS HC A05/MF A01

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N84-13168# National Transportation Safety Board, Washington, D. C.

AIRCRAFT ACCIDENT REPORT - UNITED AIRLINES FLIGHT 2885, N8053U, MCDONNELL DOUGLAS DC-8-54F, DETROIT, MICHIGAN, JANUARY 11, 1983

31 Aug. 1983 62 p
(PB83-910407; NTSB/AAR-83/07) Avail: NTIS HC A04/MF A01 CSCL 01C

On January 11, 1983, United Airlines Flight 2885, a McDonnell Douglas DC-8-54F, N8053U, was being operated as a regularly scheduled cargo flight from Cleveland, Ohio, to Los Angeles, California, with an en route stop at Detroit, Michigan. United 2885 departed Cleveland at 0115 and arrived at the Detroit Metropolitan Wayne County Airport at 0152, where cargo for Detroit was unloaded, the airplane was refueled, and cargo for Los Angeles was loaded. At 0249:58, United 2885 called for clearance onto runway 21R and was cleared for takeoff at 0250:03. Visual meteorological conditions prevailed at the time, and the company had filed and been cleared for a standard IFR flight plan. According to witnesses, the takeoff roll was normal, and the airplane rotated to takeoff attitude one-half to two-thirds of the way down runway 21R. After liftoff, the airplane's pitch attitude steepened abnormally, and it climbed to about 1,000 feet above ground level. The airplane then rolled to the right and descended rapidly to the ground. An explosion and fireball occurred at impact. The airplane was destroyed by impact and by the postimpact fire. The flightcrew, consisting of the captain, the first officer, and the second officer, were killed. The National Transportation Safety Board determines that the probable cause of the accident was the flightcrew's failure to follow procedural checklist requirements and to detect and correct a mistrimmed stabilizer before the airplane became uncontrollable. Contributing to the accident was the captain's allowing the second officer, who was not qualified to act as a pilot to occupy the seat of the first officer and to conduct the takeoff. Author

N84-13169# National Transportation Safety Board, Washington, D. C.
AIRCRAFT ACCIDENT REPORT - A. E. STALEY MANUFACTURING COMPANY, INC., CANADAIR CHALLENGER CL-600, N805C, HAILEY, IDAHO, JANUARY 3, 1983
7 Sep. 1983 35 p
(PB83-910405; NTSB/AAR-83/05) Avail: NTIS HC A03/MF A01

About 0910 mountain standard time on January 3, 1983, a Canadair Challenger CL-600, N805C, operated by the A.E. Staley Manufacturing Company, Inc., Decatur, Illinois, crashed into a mountain about 2.2 nautical miles north of Friedman Memorial Airport, Hailey, Idaho (Sun Valley Airport). At the time, the airplane was proceeding to land at the airport. Shortly before the accident, N805C had completed an instrument flight rules (IFR) flight from Decatur to Sun Valley Airport and had descended in visual fight rules (VFR) flight conditions. The weather at the airport was overcast, ceilings were reported to have been between 800 and 1,500 feet overcast, and the visibility was 10 miles. The base of the clouds were below the tops of the surrounding mountains. N805C missed the airport, flew to the north over the town of Hailey, and into an area of lowering ceilings and worsening visibility. After passing the airport, the pilot attempted to climb above the mountains. The airplane was destroyed during the impact, and the pilot and the copilot, the only persons on board, were killed in the crash. The National Transportation Safety Board determines that the probable cause of the accident was the flightcrew's failure to adhere to the recommended visual arrival procedures for the Sun Valley Airport and its failure to execute timely terrain avoidance actions. The reasons for the flightcrew's failure could not be established conclusively. Contributing to the accident were meteorological conditions and the obscuring of terrain features and landmarks by snow that made navigation by visual references and terrain avoidance difficult. Author

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N84-13170# Committee on Science and Technology (U. S. House).
AIRCRAFT NAVIGATION TECHNOLOGY AND ERRORS
Washington GPO 1983 94 p Hearings before the Subcomm. on Transportation, Aviation and Mater. of the Comm. on Sci. and Technol., 98th Congr., 1st Sess., no. 33, 19 Sep. 1983
(GPO-26-859) Avail: Subcommittee on Transportation, Aviation and Materials

The issue of aircraft navigation technology and errors is examined. The cause of the KAL 007 incident and ways of preventing such incidents are investigated. S.L.

N84-13171# Lincoln Lab., Mass. Inst. of Tech., Lexington.
TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS): A FUNCTIONAL OVERVIEW OF ACTIVE TCAS I
V. A. Orlando and J. D. Welch 8 Apr. 1983 32 p
(Contract DOT-FA72WAI-817)
(AD-A132281; ATC-118; FAA-PM-83-9) Avail: NTIS HC A03/MF A01 CSCL 17/7

The Traffic Alert and Collision Avoidance System (TCAS) is a beacon-based airborne collision avoidance system that is able to operate in all airspace without reliance on ground equipment. The TCAS concept encompasses a range of capabilities that include TCAS I, a low-cost, limited-performance version, and TCAS II, which is intended to provide a comprehensive level of separation assurance in all current and predicted airspace environments through the end of this century. This document provides a functional overview of a TCAS I equipped with a low power active transponder detector. It includes a definition of TCAS I functions, calculated and measured surveillance performance for a low power interrogator and an implementation approach that incorporates the TCAS I functions in a Mode S transponder. Author (GRA)

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N84-13172*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMPARISON OF LOW-ALTITUDE WIND-SHEAR STATISTICS DERIVED FROM MEASURED AND PROPOSED STANDARD WIND PROFILES
J. W. Usry Nov. 1983 47 p refs
(NASA-TM-85668; L-15619; NAS 1.15:85668) Avail: NTIS HC A03/MF A01 CSCL 04B

Wind shear statistics were calculated for a simulated set of wind profiles based on a proposed standard wind field data base. Wind shears were grouped in altitude in altitude bands of 100 ft between 100 and 1400 ft and in wind shear increments of 0.025 knot/ft. Frequency distributions, means, and standard deviations for each altitude band were derived for the total sample were derived for both sets. It was found that frequency distributions in each altitude band for the simulated data set were more dispersed below 800 ft and less dispersed above 900 ft than those for the measured data set. Total sample frequency of occurrence for the two data sets was about equal for wind shear values between +0.075 knot/ft, but the simulated data set had significantly larger values for all wind shears outside these

boundaries, it is shown that normal distribution in both data sets neither data set was normally distributed; similar results are observed from the cumulative frequency distributions. E.A.K.

N84-13173*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PERFORMANCE DEGRADATION OF A TYPICAL TWIN ENGINE COMMUTER TYPE AIRCRAFT IN MEASURED NATURAL ICING CONDITIONS
Richard J. Ranaudo, Kevin L. Mikkelsen, Robert C. McKnight, and Porter J. Perkins, Jr. (Analex Corp.) 1984 31 p refs Presented at the 22nd Aerospace Sci. Meeting, Reno, Nev., 9-12 Jan. 1984; sponsored by AIAA
(NASA-TM-83564; E-1943; NAS 1.15:83564) Avail: NTIS HC A03/MF A01 CSCL 01C

The performance of an aircraft in various measured icing conditions was investigated. Icing parameters such as liquid water content, temperature, cloud droplet sizes and distributions were measured continuously while in icing. Flight data were reduced to provide plots of the aircraft drag polars and lift curves (CL vs. alpha) for the measured "iced" condition as referenced to the uniced aircraft. These data were also reduced to provide plots of thrust horsepower required vs. single engine power available to show how icing affects engine out capability. It is found that performance degradation is primarily influenced by the amount and shape of the accumulated ice. Glaze icing caused the greatest aerodynamic performance penalties in terms of increased drag and reduction in lift while aerodynamic penalties due to rime icing were significantly lower. E.A.K.

N84-13174# Aeronautical Research Labs., Melbourne (Australia).
POWER EFFECTS ON THE LONGITUDINAL CHARACTERISTICS ON SINGLE-ENGINE PROPELLER-DRIVEN AIRCRAFT
C. A. Martin Feb. 1983 114 p refs
(ARL-AERO-Rept-157; AR-002-925) Avail: NTIS HC A06/MF A01

The effects of power on the longitudinal flying qualities of a single engine propeller driven aircraft were investigated. It is shown that the effect on stability of the incidence dependent terms is described by the neutral point (h sub n) while the combined incidence and speed terms are described by the static stability limit (h sub s). The effects of each power contribution on the longitudinal static and dynamic characteristics of a basic aircraft layout, the standard case are illustrated. The influence of aircraft layout and configuration is demonstrated with both power off and power on. It is shown that net power effects are sensitive to aircraft layout and can change appreciably when flaps are defected and propeller power effects are reviewed more theoretical and numerical design methods for most power effects and more wind tunnel and flight tests for the effects of slipstream on tailplane aft are recommended. E.A.K.

N84-13175# Helsinki Univ. of Technology, Otaniemi (Finland). Lab. of Aerodynamics.
RANGE AND ENDURANCE OF JET-ENGINED AIRPLANES AT CONSTANT ALTITUDE
Seppo Laine 1983 35 p refs
(Rept-83-A1-Ser-A; ISBN-951-752-966-X; ISSN-0358-2620) Avail: NTIS HC A03/MF A01

The cruise performance of turbojet and turbofan engined airplanes flying at constant altitude is studied. The drag polar is assumed parabolic and independent of Mach number. The fuel consumption is assumed to be a linear function of net thrust (i.e., a constant plus a second constant times thrust). Formulas for range and endurance are presented for three different cruising techniques: flight at optimum instantaneous velocity, flight at constant angle of attack, and flight at constant velocity. Approximate formulas for optimum velocities (maximizing range and endurance) are derived. Author

N84-13176*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ROTOR SYSTEMS RESEARCH AIRCRAFT: FIXED-WING SIMULATIONS RESULTS
Robert M. Kufeld Dec. 1983 16 p refs
(NASA-TM-85863; A-9549; NAS 1.15:85863) Avail: NTIS HC A02/MF A01 CSCL 01C

The setup, validation, and results of the Rotor Systems Research Aircraft (RSRA) fixed-wing, moving-base simulation performed in May 1983 are covered. The emphasis of the simulation was to familiartze the pilots with the RSRA's fixed-wing configuration. Additional information concerning stall speeds, minimum control speed, and various gross weights were recorded and included in the report. Author

N84-13177*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FLIGHT TESTING THE ROTOR SYSTEMS RESEARCH AIRCRAFT (RSRA)
G. Warren Hall and Robert K. Merrill Oct. 1983 17 p Prepared in cooperation with Army Aviation Engineering Flight Activity, Edwards AFB, Calif.
(NASA-TM-85852; A-9510; NAS 1.15:85852; USAAVRADCOM-TM-83-A-1) Avail: NTIS HC A02/MF A01 CSCL 01C

In the late 1960s, efforts to advance the state-of-the-art in rotor systems technology indicated a significant gap existed between our ability to accurately predict the characteristics of a complex rotor system and the results obtained through flight verification. Even full scale wind tunnel efforts proved inaccurate because of the complex nature of a rotating, maneuvering rotor system. The key element missing, which prevented significant advances, was our inability to precisely measure the exact rotor state as a function of time and flight condition. Two Rotor Research Aircraft (RSRA) were designed as pure research aircraft and dedicated rotor test vehicles whose function is to fill the gap between theory, wind tunnel testing, and flight verification. The two aircraft, the development of the piloting techniques required to safely fly the compound helicopter, the government flight testing accomplished to date, and proposed future research programs. Author

N84-13178*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PRELIMINARY RESULTS OF THE FIRST STATIC CALIBRATION OF THE RSRA HELICOPTER ACTIVE-ISOLATOR ROTOR BALANCE SYSTEM
C. W. Acree, Jr. Nov. 1983 260 p
(NASA-TM-84395; A-9457; NAS 1.15:84395) Avail: NTIS HC A12/MF A01 CSCL 01C

The helicopter version of the Rotor Systems Research Aircraft (RSRA) is designed to make simultaneous measurements of all rotor forces and moments in flight analogous to a wind tunnel balance. Loads are measured by a combination of load cells, strain gages, and hydropneumatic active isolators which use pressure gages to measure loads. Complete evaluation of system performance required calibration of the rotor force and moment measuring system when installed in the aircraft. Measurement system responses to rotor loads obtained during the first static calibration of the RSRA helicopter are plotted and discussed. Plots of the raw transducer data are included. E.A.K.

N84-13179# Army Aeromedical Research Lab., Fort Rucker, Ala.
HELICOPTER IN-FLIGHT MONITORING SYSTEM SECOND GENERATION (HIMS 2) Final Report, Jan. 1981 - Jul. 1983
Heber D. Jones, J. Alan Lewis, and Alford A. Higdon, Jr. Aug. 1983 51 p
(DA Proj. 1E1-62777-A-878)
(AD-A132498; USAARL-83-13) Avail: NTIS HC A04/MF A01 CSCL 05/9

This report presents a description of a computerized airborne data acquisition system used to measure pilot performance in a UH-1 helicopter. The unit can record approximately 20 aircraft parameters in addition to other experimental data. This report can also serve as an operator's manual for the system. GRA

N84-13180# Naval Postgraduate School, Monterey, Calif.
HELICOPTER VERTICAL STABILIZER DESIGN CONSIDERATIONS M.S. Thesis
James E. Young Jun. 1983 59 p
(AD-A132308) Avail: NTIS HC A04/MF A01 CSCL 01/3

Helicopter vertical stabilizer design considerations are receiving increasing emphasis from the helicopter community. Recent development programs experienced problems with respect to the empennage. Naval Postgraduate School Helicopter Design Course sophistication demands inclusion of vertical stabilizer parameters. The parameters are addressed in terms of conventional airfoil design considerations such as airfoils section, planform area, aspect ratio, camber, and sweep back angle. Specific to helicopters is the relationship to the tail rotor. The fundamental design tradeoff is maximum vertical stabilizer size to optimize directional stability and flight with zero tail rotor thrust contrasted to minimum size to optimize tail rotor blockage effects. A conceptual design procedure is developed herein. Author (GRA)

N84-13144# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
BIFURCATION THEORY APPLIED TO THE STUDY OF CONTROL LOSSES ON COMBAT AIRCRAFT
P. Guicheteau *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1982-2, 207 Mar.-Apr. 1982 (ESA-TT-759) Sep. 1982 p 1-14 refs Transl. into ENGLISH from La Rech. Aerospatiale, Bull. Bimestriel (Paris) No. 1982-2, 207 Mar.-Apr. 1982 Presented at AGARD/FMP Symp. on Combat Aircraft Maneuverability, Florence, 5-8 Oct. 1981 (For primary document see N84-13143 04-01)
Avail: NTIS HC A05/MF A01

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N84-13181# Lincoln Lab., Mass. Inst. of Tech., Lexington.
AIRBORNE INTELLIGENT DISPLAY (AID) PHASE 1 SOFTWARE DEVELOPMENT
Ann C. Drumm, Walter S. Heath, and John A. Richardson 24 Oct. 1983 147 p
(Contracts F19628-80-C-0002; DOT-FA77WAI-817)
(ATC-123; FAA-PM-83-30) Avail: NTIS HC A07/MF A01

The Airborne Intelligent Display is a microprocessor-based display capable of serving as a cockpit data terminal in a variety of FAA developmental applications. A prototype of this display was developed by Lincoln Laboratory during 1979-1980 in order to evaluate and demonstrate the use of the data link between a Mode S ground sensor and Mode S transponder-equipped aircraft. The AID served as a data link interface allowing the pilot to see, respond to, and initiate communications from a ground sensor. Later, when Lincoln began testing the Traffic Alert and Collision Avoidance System (TCAS), the AID became the TCAS display device, showing position estimates for TCAS-tracked aircraft. More recently, a redesign effort, focused principally on software, was begun to extend the AID design so that it could be more quickly adapted to a variety of FAA developmental programs. This document describes the redesigned Airborne Intelligent Display, with special emphasis on software design. Author

N84-13182*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SIMULATOR STUDY OF PILOT-AIRCRAFT-DISPLAY SYSTEM RESPONSE OBTAINED WITH A THREE-DIMENSIONAL-BOX PICTORIAL DISPLAY
James J. Adams Dec. 1983 52 p refs
(NASA-TP-2122; L-15832; NAS 1.60:2122) Avail: NTIS HC A04/MF A01 CSCL 01D

The effect of varying the two important display parameters of a pictorial display on pilot opinion performance, and pilot aircraft display system servomechanism response is examined. The display presents a picture of a three dimensional box that moves along the desired path ahead of the aircraft. The two display parameters examined are the field of view of the picture (from + or - 5 deg to + or - 45 deg) and the distance to the box (from 92 m (300 ft) to 6100 m (20 000 ft)). The results show that the pilots prefer a distance to the box of 915 m (3000 ft) and a field of view of + or - 30 deg. The best performance, both in the sense of quickness of error correction and lowest standard deviation, is obtained with a distance to the box of 92 m (300 ft) and a field of view of + or - 15 deg. A pilot model analysis is used to determine the gains used by the pilots and the servomechanism response characteristics of the pilot aircraft display system. Author

N84-13183# Naval Aerospace Medical Research Lab., Pensacola, Fla.
THE EFFECTS OF CHARACTER STROKE WIDTH ON THE VISIBILITY OF A HEAD-COUPLED DISPLAY Interim Report
G. R. Barnes, G. T. Turnipseed, and F. E. Guedry, Jr. 30 Dec. 1982 18 p
(NAMRL Proj. M0096)
(AD-A132046; NAMRL-1297) Avail: NTIS HC A02/MF A01 CSCL 06/19

Experiments on visual-vestibular interaction with head-fixed displays have involved many different display types. This experiment is one of a series directed toward obtaining systematic information of effects of display characteristics on visual performance when man is in motion. When man is required to view a head-fixed display during body movement, his reading performance is degraded because of inadequate suppression of the vestibulo-ocular reflex. An experiment has been conducted to ascertain whether visual performance can be enhanced if the characteristics of a visual; display are modified. Subjects were exposed to a 0.025 Hz angular oscillation about the yaw axis with a peak velocity of + or 120 deg/s. During both the high and low velocity phases of the waveform there was a significant improvement in reading rate when either the stroke-width of the character was decreased or the inter-character spacing was increased. The results indicate that displays consisting of well-spaced characters composed of bright thin lines are the most suitable for use in vibration conditions. GRA

N84-13184# Naval Air Test Center, Patuxent River, Md. Systems Engineering Test Directorate.
CRASH POSITION INDICATOR/CRASH SURVIVABLE FLIGHT DATA RECORDER EJECTABLE VERSUS NONEJECTABLE
Daniel M. Watters 27 Jul. 1983 28 p
(AD-A132329; AD-F630051; NATC-TM-83-1-SY) Avail: NTIS HC A03/MF A01 CSCL 14/3

All U.S. military and air carrier aircraft are required to have on board Crash Position Indicator/Crash Survivable Flight Data Recorder/Crash Survivable Cockpit Voice Recorder (CPI/CSFDR/CSCVR) systems. All air carrier aircraft use nonejectable CPI/CSFDR/CSCVR systems. U.S. and Canadian military aircraft use both ejectable and nonejectable CPI/CSFDR/CSCVR systems. Ejectable systems are used on Navy, Marine Corps, and Coast Guard aircraft, primarily because of their overwater mission. Ejectable systems are more complex that nonejectable systems. The reliability, maintainability, and survivability record for both ejectable and nonejectable systems ranges from poor to excellent depending on system design, configuration, and testing. The Search and Rescue (SAR) record for ejectable systems is excellent while the SAR record for nonejectable systems has been relatively poor. The weight, volume, and power requirements for ejectable systems are generally less than for nonejectable systems. The System Safety of all systems is excellent except for the Mortar type (personal hazard if inadvertently ejected on the ground). The acquisition cost of ejectable systems are generally greater than for nonejectable systems. Ejectable CPI/CSFDR/CSCVR systems should be used on aircraft that operate over water. All other aircraft could use either ejectable or nonejectable systems. GRA

N84-13185# Army Aviation Research and Development Command, St. Louis, Mo.
AN AIRBORNE COLOR VIDEO INSETTER
Edward A. Karcher and Vincent J. Organic Aug. 1983 28 p
(AD-A132183; AD-E850405; USAAVRADCOM-TR-83-E-1) Avail: NTIS HC A03/MF A01 CSCL 17/2

This technical report describes the design, interface, and operation of a general purpose raster scan display Color Video Insetter (CVI) which is capable of airborne operation. The CVI is divided into two independent functions, a color insetter section and a synchronization generation and distribution section. The color insetter which operates on standard red, green, and blue color signals will select one of two background video inputs for display on up to three color monitors and inset into the background externally generated dynamic color features, fixed color features, or both. There is also a separate monitor output to display only the color inset features. The synchronization generation and distribution section is capable of internal generation of television synchronization signals and distribution of these signals to six external users. There is also an external mode in which the synchronization circuitry operates as a distribution amplifier providing six outputs for each of three inputs from an external master synchronization source. Figure 1 shows the front panels of both the CVI and the control units. All input and output lines and control functions are located on these two panels. GRA

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N84-13186* Hamilton Standard, Windsor Locks, Conn.
TECHNOLOGY AND BENEFITS OF AIRCRAFT COUNTER ROTATION PROPELLERS
A. L. Weisbrich, J. Godston (Pratt & Whitney Aircraft, East Hartford, Conn.), and E. Bradley (Lockheed-Georgia Co., Marietta) Dec. 1982 330 p
(Contract NAS3-23043)
(NASA-CR-168258; NAS 1.26:168258; HSER-8856) Avail: Technical Monitor, NASA. Lewis Research Center, Cleveland CSCL 01A

Results are reported of a NASA sponsored analytical investigation into the merits of advanced counter rotation propellers for Mach 0.80 commercial transport application. Propeller and gearbox performance, acoustics, vibration characteristics, weight, cost and maintenance requirements for a variety of design parameters and special features were considered. Fuel savings in the neighborhood of 9 percent relative to single rotation configurations are feasible through swirl recovery and lighter gearboxes. This is the net gain which includes a 5 percent acoustic treatment weight penalty to offset the broader frequency spectrum of the noise produced by counter rotation propellers. Author

N84-13187*# Pennsylvania State Univ., University Park.
A THEORETICAL AND EXPERIMENTAL STUDY OF TURBULENT PARTICLE-LADEN JETS Annual Report
J-S. Shuen, A. S. P. Solomon, Q-F. Zhang, and G. M. Faeth Nov. 1983 106 p refs
(Grant NAG3-190)
(NASA-CR-168293; NAS 1.26:168293) Avail: NTIS HC A06/MF A01 CSCL 21E

Mean and fluctuating velocities of both phases, particle mass fluxes, particle size distributions in turbulent particle-laden jets were measured. The following models are considered: (1) a locally homogeneous flow (LHF) model, where slip between the phases was neglected; (2) a deterministic separated flow (DSF) model, where slip was considered but effects of particle dispersion by turbulence were ignored; and (3) a stochastic separated flow (SSF) model. The SSF model performed reasonably well with no modifications in the prescriptions for eddy properties from its original calibration. A modified k- model, incorporating direct contributions of interphase transport on turbulence properties (turbulence modulation), was developed within the framework of the SSF model. E.A.K.

N84-13188*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FLAME RADIATION AND LINER HEAT TRANSFER IN A TUBULAR-CAN COMBUSTOR
R. W. Claus, G. M. Neely, and F. M. Humenik [1983] 23 p refs Proposed for presentation at the 22nd Aerospace Sci. Meeting, Reno, 9-12 Jan. 1984; sponsored by AIAA
(NASA-TM-83536; E-1909; NAS 1.15:83536) Avail: NTIS HC A02/MF A01 CSCL 21E

Heat transfer within a combuster were examined. Total and spectral flame radiation in a tubular can combustor at a series of parametric operating conditions was measured. Radiation measurements were taken for a range of inlet air pressures from 0.34 to 2.0 MPa, inlet air temperatures from 533 to 700 K, with two different fuels, Jet-A and ERBS. Measurements of liner temperatures combined with the parametric radiation results allowed a calculation of the combustor liner heat loads. Flame emissivity was determined from the spectral measurements. E.A.K.

N84-13189*# California Univ., Berkeley.
NUMERICAL MODELING OF TURBULENT FLOW IN A CHANNEL Final Report
Y.-W. Dai, A. F. Ghoniem, F. S. Sherman, and A. K. Oppenheim Mar. 1983 68 p refs
(Grant NAG3-131; Contract W-7405-eng-48; Grant NSF CPE-81-15163)
(NASA-CR-168278; DOE/NASA-0131/2; NAS 1.26:168278) Avail: NTIS HC A04/MF A01 CSCL 21E

Two-dimensional incompressible turbulent flow in a channel with a backward-facing step was studied numerically by Chorin's Random Vortex Method (RVM), an algorithm capable of tracing the action of elementary turbulent eddies and their cumulative effects without imposing any restrictions upon their motions. The step occurs in one side of a channel with otherwise flat, parallel walls; its height equals 1/3, 1/4 or 1/5 the width of the channel downstream. The main objective was to investigate the behavior of the large-scale turbulent eddies in a flow and the flow characteristics in the separated shear layer, the reattached zone, and the rebuilding boundary layer after reattachment. The unsteady vorticity field and the distribution of time-averaged turbulent statistics were obtained. The effects of expansion step height and initial boundary layer state were also studied. Comparisons were made with the available experimental results. The agreement is satisfactory in the velocity profiles and in the reattachment length, and fairly good in the turbulence profiles. Also a mechanism of the development of the reattaching turbulent flow was suggested by the numerical results. Author

N84-13190*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THREE-DIMENSIONAL VISCOUS DESIGN METHODOLOGY FOR ADVANCED TECHNOLOGY AIRCRAFT SUPERSONIC INLET SYSTEMS
Bernhard H. Anderson Dec. 1983 64 p refs Presented at the 21st Aerospace Sci. Meeting, Reno, Nev., 9-12 Jan. 1984
(NASA-TM-83558; E-1936; NAS 1.15:83558; AIAA-84-0192) Avail: NTIS HC A04/MF A01 CSCL 21E

A broad program to develop advanced, reliable, and user oriented three-dimensional viscous design techniques for supersonic inlet systems, and encourage their transfer into the general user community is discussed. Features of the program include: (1) develop effective methods of computing three-dimensional flows within a zonal modeling methodology; (2) ensure reasonable agreement between said analysis and

selective sets of benchmark validation data; (3) develop user orientation into said analysis; and (4) explore and develop advanced numerical methodology. Author

N84-13191# Aeronautical Research Labs., Melbourne (Australia).
ENGINE PERFORMANCE MONITORING: ROLLS-ROYCE DART AND ALLISON T56 TURBO-PROP ENGINES
D. E. Glenny Sep. 1982 44 p refs
(ARL-MECH-ENG-NOTE-393; AR-002-911) Avail: NTIS HC A03/MF A01

Two Manual Inflight Engine Performance Monitoring Procedures for use on turboprop engines were devised. The first method, which involves relatively complex data reduction, is applicable in its present form only to the Rolls-Royce Dart engine. The second method, requiring only simple arithmetic calculations, may be used on any multi-engine aircraft. The basic principles and operating procedures for both methods are described. Analysis of inflight engine performance data for the Dart showed that even through consistent results in terms of performance trends can be produced, the computational equipment and procedures required to derive the appropriate trend graphics are excessive and are considered not to be warranted or cost-effective at present. With the second method, an analysis of trial data obtained from the Hercules C130-T56 aircraft has shown that effective engine performance monitoring trend plots, for both torque and fuel flow deviations, may be obtained. The simple data reduction procedures involved allow the relevant analyses to be carried out in flight by a flight engineer or suitable qualified person, thus giving immediate engine trend information for use by aircrew and maintenance personnel on a day-to-day basis. Author

N84-13192# Council for Scientific and Industrial Research, Pretoria (South Africa).
WORK DONE TO DETERMINE THE SOURCE OF ERRORS ON CONDITIONED PRESSURE TRANSDUCE SIGNALS IN THE JT9D-7F TURBOFAN ENGINES USED ON SAA BOEING 747 AIRCRAFT Progress Report
M Gafner Oct. 1982 25 p
(NIAST-82/78; ISBN-0-7988-2606-1) Avail: NTIS HC A02/MF A01

Details and results of tests completed to determine the influence of engine vibration on pressure transducers in the JT9 D-7F engines used on Boeing 747 aircraft are presented. Recommendations for further investigation are made. S.L.

N84-13193*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
BLADE LOSS TRANSIENT DYNAMICS ANALYSIS WITH FLEXIBLE BLADED DISK Final Report
V. C. Gallardo, G. Black, L. Bach, S. Cline, and A. Storace Apr. 1983 269 p refs
(Contract NAS3-23281)
(NASA-CR-168176; NAS 1.26:168176) Avail: NTIS HC A12/MF A01 CSCL 21E

The transient dynamic response of a flexible bladed disk on a flexible rotor in a two rotor system is formulated by modal synthesis and a Lagrangian approach. Only the nonequilibrated one diameter flexible mode is considered for the flexible bladed disk, while the two flexible rotors are represented by their normal modes. The flexible bladed disk motion is modeled as a combination of two one diameter standing waves, and is coupled inertially and gyroscopically to the flexible rotors. Application to a two rotor model shows that a flexible bladed disk on one rotor can be driven into resonance by an unbalance in the other rotor, and at a frequency equal to the difference in the rotor speeds. Author

N84-13194*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
A PRELIMINARY STUDY OF SOLAR POWDERED AIRCRAFT AND ASSOCIATED POWER TRAINS Final Report
David W. Hall, Charles D. Fortenbach, Emanual V. Dimiceli, and Robert W. Parks Dec. 1983 205 p refs
(Contract NAS1-16975)
(NASA-CR-3699; NAS 1.26:3699) Avail: NTIS HC A10/MF A01 CSCL 21E

The feasibility of regeneratively powered solar high altitude powered platform (HAPP) remotely piloted vehicles was assessed. Those technologies which must be pursued to make long duration solar HAPPs feasible are recommended. A methodology which involved characterization and parametric analysis of roughly two dozen variables to determine vehicles capable of fulfilling the primary mission are defined. One of these vehicles was then conceptually designed. Variations of each major design parameter were investigated along with state-of-the-art changes in power train component capabilities. The midlatitude mission studied would be attainable by a solar HAPP if fuel cell, electrolyzer and photovoltaic technologies are pursued. Vehicles will be very large and have very lightweight structures in order to attain the combinations of altitude and duration required by the primary mission. S.C.L.

N84-13195*# Marquardt Corp., Van Nuys, Calif.
PRELIMINARY SCRAMJET DESIGN FOR HYPERSONIC AIR-BREATHING MISSILE APPLICATION Final Report
Charles H. Carlson Washington NASA Nov. 1983 71 p refs (Contract NAS1-15434)
(NASA-CR-3742; NAS 1.26:3742; S-1585) Avail: NTIS HC A04/MF A01 CSCL 21E

A conceptual design study of a scramjet engine was conducted for a hypersonic surface to air missile (HYSAM). The definition of the engine was based upon the requirements of accelerating the HYSAM from Mach 4 at 20,000 feet to Mach 6 at 100,000 feet and the cruise conditions at Mach 6. The resulting external and internal environmental conditions were used by various engineering disciplines performing design, stress and heat transfer analysis. A detailed structural analysis was conducted along with an indepth thermal analysis. Structurally all the components within the system exhibit positive margins of safety. A feasible concept was defined which uses state-of-the-art materials and existing TMC technology. The engine basically consists of a three dimensional carbon/carbon combustor/nozzle secured to an FS-85 columbium inlet. The carbon/carbon liner is sheathed with carbon felt insulation to thermally protect the FS-85 structure and skin. The thermal analysis of the engine indicates that a thermally viable configuration exists. Author

N84-13196# Army Materials and Mechanics Research Center, Watertown, Mass.
CHARACTERIZATION OF CERAMIC VANE MATERIALS FOR 10KW TURBOALTERNATOR Final Report
George D. Quinn, Donald R. Messier, and Liselotte J. Schioler Apr. 1983 32 p
(DA Proj. 1L7-63702-DG-11)
(AD-A132505; AMMRC-TR-83-18) Avail: NTIS HC A03/MF A01 CSCL 21/5

Characterization was done on four vane candidate materials: hot pressed silicon nitride, sintered silicon nitride, sintered silicon carbide, and siliconized silicon carbide, being considered for use in a small turbine engine. Chemistry, phase content, and room temperature mechanical strength were in the ranges expected for such materials. Fracture locations and origins were identified whenever possible, and measurements of fracture mirror radii and flaw sizes were done to enable fracture mechanics parameters to be calculated. Oxidation resistance of all materials was excellent at 950 to 1100 C. High temperature (800 to 1200 C) mechanical behavior was characterized via stepped temperature stress rupture and conventional stress rupture testing. A possible instability was found in the sintered silicon nitride at 1000 C. The hot pressed silicon nitride was subject to static fatigue at temperatures from 800 to 1100 C. The two silicon carbide materials performed adequately over the same temperature range. GRA

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N84-13197*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FLIGHT TEST AND ANALYSES OF THE B-1 STRUCTURAL MODE CONTROL SYSTEM AT SUPERSONIC FLIGHT CONDITIONS Final Report
John H. Wykes, Martin J. Kelpl, and Michael J. Brosnan Dec. 1983 108 p refs
(Contract NAS4-2932)
(NASA-CR-170405; NAS 1.26:170405) Avail: NTIS HC A06/MF A01 CSCL 01C

A practical structural mode control system (SMCS) that could be turned on at takeoff and be left on for the entire flight was demonstrated. The SMCS appears to be more effective in damping the key fuselage bending modes at supersonic speeds than at the design point of Mach 0.85 (for fixed gains). The SMCS has an adverse effect on high frequency symmetric modes; however, this adverse effect did not make the system unstable and does not appear to affect ride quality performance. The vertical ride quality analyses indicate that the basic configuration without active systems is satisfactory for long term exposure. If clear air turbulence were to be encountered, indications are that the SMCS would be very effective in reducing the adverse accelerations. On the other hand, lateral ride quality analyses indicate that the aircraft with the SMCS on does not quite meet the long term exposure criteria, but would be satisfactory for shot term exposure at altitude. Again, the lateral SMCS was shown to be very effective in reducing peak lateral accelerations. S.C.L.

N84-13198*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FLIGHT-TEST OF THE GLIDE-SLOPE TRACK AND FLARE-CONTROL LAWS FOR AN AUTOMATIC LANDING SYSTEM FOR A POWERED-LIFT STOL AIRPLANE
DeLamar M. Watson, Gordon H. Hardy, and David N. Warner, Jr. Dec. 1983 89 p refs
(NASA-TP-2128; A-9199; NAS 1.60:2128) Avail: NTIS HC A05/MF A01 CSCL 01C

An automatic landing system was developed for the Augmentor Wing Jet STOL Research Airplane to establish the feasibility and examine the operating characteristics of a powered-lift STOL transport flying a steep, microwave landing system (MLS) glide slope to automatically land on a STOL port. The flight test results address the longitudinal aspects of automatic powered lift STOL airplane operation including glide slope tracking on the backside of the power curve, flare, and touchdown. Three different autoland control laws were evaluated to demonstrate the tradeoff between control complexity and the resulting performance. The flight test and simulation methodology used in developing conventional jet transport systems was applied to the powered-lift STOL airplane. The results obtained suggest that an automatic landing system for a powered-lift STOL airplane operating into an MLS-equipped STOL port is feasible. However, the airplane must be provided with a means of rapidly regulation lift to satisfactorily provide the glide slope tracking and control of touchdown sink rate needed for automatic landings. S.L.

N84-13199# Naval Postgraduate School, Monterey, Calif.
A MICROCOMPUTER PROGRAM PACKAGE OF THE USAF STABILITY AND CONTROL DATCOM M.S. Thesis
John Randolph McGowan Jun. 1983 38 p
(AD-A132143; AD-E850405) Avail: NTIS HC A03/MF A01 CSCL 09/2

A microcomputer application program package utilizing the methodology of the USAF STABILITY AND CONTROL DATCOM has been implemented to estimate aircraft stability and control derivatives. The program package is designed for use on personal computer systems which utilize the BASIC programming language. GRA

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N84-13200# National Aerospace Lab., Tokyo (Japan).
A NEW OPERATION METHOD FOR A LARGE-SCALE SHOCK TUNNEL
Kunio Soga, Yasutoshi Inoue, and Takashi Yamazaki 1983 14 p refs In JAPANESE; ENGLISH summary
(NAL-TR-765; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

In order to construct and operate a large-scale shock tunnel for use in such projects as the recovery of rocket payloads and artificial satellites, a new operational method for short-duration wind tunnels using a large-orifice plate and high speed valves is proposed. The practicability of this method was studied using the gun tunnel, and the results of these experiments are shown. The measurements of the tunnel stagnation pressure and temperature changing the orifice area with and without a piston; performance test of the high speed valve installed in front of the nozzle; and measurements of pitot pressure and stagnation heat-transfer rate of the cylinder to diagnose the flow established in the test section are provided. The results of the preliminary experiment operation of a large-scale short duration wind tunnel. The exclusion of the diaphragms and the piston enabled us not only to make a large-scale wind tunnel but also to eliminate dust in the flow. By using a large-orifice plate together with high speed valves, early stabilization of tunnel stagnation conductions and a steady flow in the test section were achieved. Author

N84-13201# Naval Postgraduate School, Monterey, Calif.
A GAS TURBINE COMBUSTOR TEST FACILITY FOR FUEL COMPOSITION INVESTIGATIONS M.S. Thesis
Robert William DuBeau Jun. 1983 62 p
(AD-A132479) Avail: NTIS HC A04/MF A01 CSCL 14/2

Construction, check-out/verification and initial tests of a full scale gas turbine combustor test facility were accomplished. Water cooled gas sampling and stagnation probes and a multiple wavelength light extinction measurement apparatus for determination of mean particulate size were evaluated. The facility will be used for subsequent fuel composition/fuel additive evaluations to determine the resulting effects on soot production and consumption rates. Author (GRA)

N84-13202# Naval Postgraduate School, Monterey, Calif.
AN EXPERIMENTAL INVESTIGATION OF SOOT BEHAVIOR IN A GAS TURBINE COMBUSTOR Engineer's Thesis
Andrew Clarence Krug Jun. 1983 75 p
(AD-A132210) Avail: NTIS HC A04/MF A01 CSCL 14/2

A full scale gas turbine combustor test facility was designed, constructed, and initially operated to determine the performance of a gas turbine combustor and the associated combustion diagnostic apparatus. The test cell was put through an initial series of four tests. The combustor was operated at 75% of normal operating conditions. A water-cooled extractive probe sampling system was used to obtain a particulate sample and an optical system was used to measure the transmissivity inside the combustor and at the exhaust. The opacity of the exhaust gases was also monitored. The initial test series verified the adequacy of the test cell control apparatus as well as the extractive probe sampling system. The optical technique employed appeared to be adequate for the purpose of determining the mean particle diameter but lacked sensitivity for use at the engine exhaust. Recommenda-

tions were made for facility and equipment improvements.
Author (GRA)

N84-13203# Los Alamos Scientific Lab., N. Mex. Theoretical Div.
PHYSICS AT THE PROPOSED NATIONAL UNDERGROUND SCIENCE FACILITY
Michael Martin Nieto 1983 15 p refs Presented at the 14th Intern. Symp. on Multiparticle Dyn., Lake Tahoe, Nev., 22 Jun. 1983
(Contract W-7405-eng-36)
(DE84-001345; LA-UR-83-2610; CONF-830689-7) Avail: NTIS HC A02/MF A01

The scientific, technical, and financial reasons for building a National Underground Science Facility are discussed. After reviewing examples of other underground facilities, we focus on the Los Alamos proposal and the national for its choice of site.
DOE

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N84-13204*# National Aeronautics and Space Administration, Washington, D. C.
TECHNOLOGY FOR LARGE SPACE SYSTEMS: A BIBLIOGRAPHY WITH INDEXES
Jul. 1983 117 p
(NASA-SP-7046(09); NAS 1.21:7046(09)) Avail: NTIS HC A06/MF A01 CSCL 22A

This bibliography lists 414 reports, articles and other documents introduced into the NASA scientific and technical information system between January 1, 1983 and June 30, 1983. Information on technology development and mission design in the area of Large Space System Technology is provided. Subject matter is grouped according to systems, interactive analysis and design, structural and thermal analysis and design, structural concepts and control systems, electronics. advanced materials, assembly concepts, propulsion, and solar power satellite systems. Author

N84-13205*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
POTENTIAL MEANS OF SUPPORT FOR MATERIALS PROCESSING IN SPACE. A HISTORY OF GOVERNMENT SUPPORT FOR NEW TECHNOLOGY
Eugene C. McKannan Nov. 1983 23 p refs
(NASA-TM-82554; NAS 1.15:82554) Avail: NTIS HC A02/MF A01 CSCL 22A

Development of a given technology for national defense and large systems developments when the task is too large or risky for entrepreneurs, yet is clearly in the best interest of the nation are discussed. Advanced research to identify areas of interest was completed. Examples of commercial opportunities are the McDonnell-Douglas Corporation purification process for pharmaceutical products and the Microgravity Research Associates process for growing gallium arsenide crystals in space. Author

N84-13206*# National Aeronautics and Space Administration, Washington, D. C.
NASA SPACE BIOLOGY ACCOMPLISHMENTS, 1982
Thora W. Halstead and Linda G. Pleasant Dec. 1983 119 p Prepared in cooperation with George Washington Univ., Washington, D.C.
(Contract NASw-3165)
(NASA-TM-86244; NAS 1.15:86244) Avail: NTIS HC A06/MF A01 CSCL 22A

Summaries of NASA's Space Biology Program projects are provided. The goals, objectives, accomplishments, and future plans of each project are described in this publication as individual technical summaries. Author

N84-13207*# Westech Systems, Inc., Phoenix, Ariz.
MICROGRAVITY SILICON ZONING INVESTIGATION Annual Report, 15 Jul. 1982 - 15 Jul. 1983
Edward L. Kern and Gerald L. Gill, Jr. 15 Jul. 1983 90 p refs (Contract NAS8-34920)
(NASA-CR-170919; NAS 1.26:170919) Avail: NTIS HC A05/MF A01 CSCL 22A

A resistance heated zoner, suitable for early zoning experiments with silicon, was designed and put into operation. The initial power usage and size was designed for an shown to be compatible with payload carriers contemplated for the Shuttle. This equipment will be used in the definition and development of flight experiments and apparatus for float zoning silicon and other materials in microgravity. Author

N84-13208*# Essex Corp., Huntsville, Ala.
ANALYSIS OF LARGE SPACE STRUCTURES ASSEMBLY: MAN/MACHINE ASSEMBLY ANALYSIS Final Report
Washington NASA Dec. 1983 172 p refs
(Contract NAS8-32989)
(NASA-CR-3751; NAS 1.26:3751; H-83-03) Avail: NTIS HC A08/MF A01 CSCL 22A

Procedures for analyzing large space structures assembly via three primary modes: manual, remote and automated are outlined. Data bases on each of the assembly modes and a general data base on the shuttle capabilities to support structures assembly are presented. Task element times and structure assembly component costs are given to provide a basis for determining the comparative economics of assembly alternatives. The lessons learned from simulations of space structures assembly are detailed. Author

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N84-13209# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SIMULATION AND ANALYSIS OF LOW ALTITUDE TERRESTRIAL SATELLITES [SIMULACAO E ANALISE DE ATITUDE DE SATELITES ERRESTRES DE BAIXA ALTITUDE]
Joao Moro and Valdemir Carrara May 1983 14 p refs Presented at the 7th Brazilian Mech. Eng. Congr., COBEM '83, Uberlandia, Brazil, 13-16 Dec. 1983
(INPE-2754-PRE/330) Avail: NTIS HC A02/MF A01

A numerical simulator of attitude motion and related observations for Earth artificial satellites is presented. The purpose is to provide test conditions for attitude determination using statistical procedures. The mathematical model of attitude is a rigid body and includes the perturbations due to interaction with the space environment. The simulated data consist of Sun angles measurements, which are the arc-length separation between the attitude and the Sun, and radio angles measurements which are the arc-length separation between the attitude and the center of Earth. Author

N84-13402*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ORBIT DETERMINATION OF HIGHLY ELLIPTICAL EARTH ORBITERS USING VLBI AND DELTA VLBI MEASUREMENTS
R. B. Frauenholz and J. Ellis *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 1-13 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 22A

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N84-13210 Utah State Univ., Logan.
WAVE AND PARTICLE OBSERVATIONS ASSOCIATED WITH THE BEAM PLASMA DISCHARGE IN A SPACE SIMULATION CHAMBER Ph.D. Thesis
William Francis Denig 1982 221 p
Avail: Univ. Microfilms Order No. DA8313539

The interaction of a 1-kilovolt beam of electrons and a low density plasma was experimentally studied to determine the steady state and dynamic aspects of the spectra for electrostatic and electromagnetic waves and of the charged particle energy distributions associated with the Beam Plasma Discharge in a space simulation chamber. This current-dependent, beam-plasma instability distinguished itself from the classical interaction by an increased ionization rate, enhanced wave emissions, and greatly modified particle distributions. Waves generated in the whistler mode and intense oscillations near the electron plasma frequency were unique features of the steady state discharge, while Bernstein mode waves were generated as a result of temporal density variations within the magnetically confined plasma column. The detected primary electrons showed a marked energy degradation for Beam Plasma Discharge conditions and the secondary electron spectrum indicated the presence of a suprathermal population.
Dissert. Abstr.

N84-13211*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CHARACTERIZATION OF THE GENERAL PURPOSE RESEARCH FURNACE FOR LOW-G DIRECTIONAL SOLIDIFICATION EXPERIMENTS
R. K. Crouch, A. L. Fripp, W. J. Debnam, I. O. Clark, J. W. Zweiner, and F. M. Carlson Nov. 1983 25 p refs
(NASA-TM-85718; NAS 1.15:85718) Avail: NTIS HC A02/MF A01 CSCL 14B

Preliminary tests have shown that it is possible to control the temperature settings in NASA's General Purpose Research Furnace in such a manner as to obtain a constant rate of movement of a high temperature isotherm down the length of the furnace. These tests also showed that a temperature gradient on the order of 40 deg cm could be obtained in the furnace while moving the particular isotherm of interest, i.e., 900 C. This provides the possibility of performing directional solidification experiments in the furnace on a MEA flight in the low gravity environment provided by the Shuttle. A functional dependency of growth rate on perturbations during the the growth has been derived and shows the importance of avoiding non-steady growth rates and changing temperature gradients. Author

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N84-13212*# Princeton Resources, Inc., N. J. Dept. of Mechanical and Aerospace Engineering.
EVALUATION OF NON-INTRUSIVE FLOW MEASUREMENT TECHNIQUES FOR A RE-ENTRY FLIGHT EXPERIMENT Final Report, 26 Jan. 1982 - 25 Jan. 1983
R. B. Miles, D. A. Santavicca, and M. Zimmermann Nov. 1983 97 p refs
(Contract NCC1-64)
(NASA-CR-172142; NAS 1.26:172142) Avail: NTIS HC A05/MF A01 CSCL 22B

This study evaluates various non-intrusive techniques for the measurement of the flow field on the windward side of the Space Shuttle orbiter or a similar reentry vehicle. Included are linear (Rayleigh, Raman, Mie, Laser Doppler Velocimetry, Resonant Doppler Velocimetry) and nonlinear (Coherent Anti-Stokes Raman, Laser-Induced Fluorescence) light scattering, electron-beam fluorescence, thermal emission, and mass spectroscopy. Flow-field properties were taken from a nonequilibrium flow model by Shinn, Moss, and Simmonds at the NASA Langley Research Center. Conclusions are, when possible, based on quantitative scaling of known laboratory results to the conditions projected. Detailed discussion with researchers in the field contributed further to these conclusions and provided valuable insights regarding the experimental feasibility of each of the techniques. Author

N84-13213# National Aerospace Lab., Tokyo (Japan).
A STUDY OF AIR BREATHING ROCKETS. 3: SUPERSONIC MODE COMBUSTORS
Goro Masuya, Nobuo Chinzei, Kenji Kudo, Atsuo Murakami, Tomoyuki Komuro, and Shinichi Ishii 1983 21 p refs In JAPANESE; ENGLISH summary
(NAL-TR-756; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

An experimental study was made on supersonic mode combustors of an air breathing rocket engine. Supersonic streams of room-temperature air and hot fuel-rich rocket exhaust were coaxially mixed and burned in a concially diverging duct of 2 deg half-angle. The effect of air inlet Mach number and excess air ratio was investigated. Axial wall pressure distribution was measured to calculate one dimensional change of Mach number and stagnation temperature. Calculated results showed that supersonic combustion occurred in the duct. At the exit of the duct, gas sampling and Pitot pressure measurement was made, from which radial distributions of various properties were deduced. The distribution of mass fraction of elements from rocket exhaust showed poor mixing performance in the supersonic mode combustors compared with the previously investigated cylindrical subsonic mode combustors. Secondary combustion efficiency correlated well with the centerline mixing parameter, but not with Annushkin's non-dimensional combustor length. No major effect of air inlet Mach number or excess air ratio was seen within the range of conditions under which the experiment was conducted. Author

N84-13214# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
BANK-TO-TURN CONTROL M.S. Thesis - Florida Univ.
Donald J. Caughlin, Jr. 1983 111 p
(AD-A132491; AFIT/CI/NR-83-25T) Avail: NTIS HC A06/MF A01 CSCL 16/4

Linear optimal control laws used for bank-to-turn missile guidance were investigated. The performance of these control laws was erratic because their development neglected attitude dependent constraints on the control variables. The effects of an inequality constraint on the control variable in a fixed final time, zero error controller were analyzed. This analysis led to the conclusion that the accepted technique of applying the constraint to the unconstrained optimal control solution is valid only if the control is saturated during the initial portion of the trajectory. Constraints during the terminal phase must be anticipated by adjusting intermediate boundary conditions. The nonzero set point optimal control law used for the analysis of inequality constraints was incorporated into a nonlinear Bank-to-turn attitude controller. This controller, which was evaluated on a six degree of freedom simulation, successfully eliminated the deficiencies of the linear controllers. Author (GRA)

N84-13215# Air Force Academy, Colo.
EXPERIMENTAL AERODYNAMIC CHARACTERISTICS OF MISSILES WITH SQUARE CROSS SECTIONS
G. J. Zollars, R. T. Yechout, D. C. Daniel (AFATL, Eglin AFB, Fla.), and L. E. Lijewski (AFATL, Eglin AFB, Fla.) 15 May 1983 254 p
(AD-A132278; USAFA-TN-83-8) Avail: NTIS HC A12/MF A01

CSCL 20/4

A series of quantitative and qualitative tests were conducted to expand the aerodynamic data base of square cross-section missiles. Quantitative tests included measuring forces and moments acting on square missiles, and measuring flowfield pressures on the leeward side of square missiles at various configurations and orientations in a subsonic wind tunnel. Force and moment data is presented showing the effects of variation in body corner radius, nose and fin shapes, pitch angle, and roll angle. Flowfield pressure and crossflow velocity data are presented for missiles of various pitch angles, roll angles, body corner radii, and fineness ratios (length to width ratio). In addition, flowfield data is shown along the axial length of a square missile. Qualitative tests included photographic tuft grids in the flowfield and photographing oil shear stress patterns on the surface of various missiles. These qualitative photographs are presented for various missile configurations and orientations. Author (GRA)

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N84-13216# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

SHOT TO THE MOON FROM A CANNON

V. Mikhalev 24 Aug. 1983 7 p Transl. into ENGLISH from Nauchno-Tekhn. Obshchestva SSSR (USSR), no. 12, 1966 p 60 (AD-A132554; FTD-ID(RS)T-0762-83) Avail: NTIS HC A02/MF A01 CSCL 19/4

The idea of interplanetary transportation of cargo by use of an electrical cannon is considered. B.G.

N84-13217# Air Force Systems Command, Patrick AFB, Fla.

OPERATIONAL APPLICATIONS OF MILITARY TEST RANGES IN SPACE TRANSPORTATION SYSTEM PROGRAMS Final Report

Albert M. Thomas 8 Aug. 1983 6 p

(AD-A132535; ESMC-TR-83-04) Avail: NTIS HC A02/MF A01 CSCL 14/2

Traditionally, military Ranges have existed to verify performance and aid in designed of weapons and weapons systems. Those Ranges which become involved in flight and exo-atmospheric applications have also developed an operational capability used to support ongoing space and missile programs. This paper addresses military Range support capabilities and specific operational aspects of Range support to the Space Transportation System (STS). Its primary emphasis will be on C-band radar tracking and data flows rather than on the more familiar facets of range support. Author (GRA)

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N84-13403*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE EFFECTS OF REED-SOLOMON CODE SHORTENING ON THE PERFORMANCE OF CODED TELEMETRY SYSTEMS

L. J. Deutsch *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 14-20 refs (For primary document see N84-13401 04-32)

Avail: NTIS HC A08/MF A01 CSCL 09F

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N84-13413*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ENERGY CONSUMPTION ANALYSIS OF THE VENUS DEEP SPACE STATION (DSS-13)

N. V. Hayes *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 114-123 refs (For primary document see N84-13401 04-32)

Avail: NTIS HC A08/MF A01 CSCL 22B

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N84-13218*# Boeing Aerospace Co., Seattle, Wash.

STUDY OF AUXILIARY PROPULSION REQUIREMENTS FOR LARGE SPACE SYSTEMS, VOLUME 2 Final Report

W. W. Smith and G. W. Machles Sep. 1983 305 p refs

(Contract NAS3-23248)

(NAA-CR-168193; NAS 1.26:168193; D880-27728-2-Vol-2) Avail: NTIS HC A14/MF A01 CSCL 21H

A range of single shuttle launched large space systems were identified and characterized including a NASTRAN and loading dynamics analysis. The disturbance environment, chacterization of thrust level and APS mass requirements, and a study of APS/LSS interactions were analyzed. State-of-the-art capabilities for chemical and ion propulsion were compared with the generated propulsion requirements to assess the state-of-the-art limitations and benefits of enhancing current technology. Author

N84-13219# California Univ., Livermore. Lawrence Livermore Lab.

A LASER-FUSION ROCKET FOR INTERPLANETARY PROPULSION

Roderick A. Hyde 27 Sep. 1983 14 p refs Presented at the 34th Intern. Astronautical Federation, Budapest, 10-17 Oct. 1983 Submitted for publication

(Contract W-7405-eng-48)

(DE84-001238; UCRL-88857; CONF-8310171-1) Avail: NTIS HC A02/MF A01

A rocket powered by fusion microexplosions is well suited for quick interplanetary travel. Fusion pellets are sequentially injected into a magnetic thrust chamber. There, focused energy from a fusion Driver is used to implode and ignite them. Upon exploding, the plasma debris expands into the surrounding magnetic field

and is redirected by it, producing thrust. This paper discusses the desired features and operation of the fusion pellet, its Driver, and magnetic thrust chamber. A rocket design is presented which uses slightly tritium-enriched deuterium as the fusion fuel, a high temperature KrF laser as the Driver, and a thrust chamber consisting of a single superconducting current loop protected from the pellet by a radiation shield. This rocket can be operated with a power-to-mass ratio of 110 W gm(+1), which permits missions ranging from occasional 9 day VIP service to Mars, to routine 1 year, 1500 ton, Plutonian cargo runs. DOE

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N84-13220# Argonne National Lab., Ill.
QUANTUM-MECHANICAL CALCULATIONS OF THE PROPERTIES OF LIQUID He DROPLETS
Steven C. Pieper 1983 5 p refs Presented at the 3rd Intern. Conf. on Recent Progr. in Many-Body Theories, Altenberg, West Germany, 29 Aug. 1983
(Contract W-31-109-eng-38)
(DE84-000164; CONF-8308125-1) Avail: NTIS HC A02/MF A01

Calculations were made of the ground state properties of droplets of liquid (4)He and for droplets of liquid (3)He. The already published (4)He results are summarized; the (3)He results presented are preliminary. DOE

24 COMPOSITE MATERIALS

Includes laminates.

N84-13221*# Illinois Univ., Urbana.
THE MECHANICS OF DELAMINATION IN FIBER-REINFORCED COMPOSITE MATERIALS. PART 1: STRESS SINGULARITIES AND SOLUTION STRUCTURE Final Report
S. S. Wang and I. Choi Nov. 1983 45 p refs 2 Vol.
(Contract NAG1-286)
(NASA-CR-172269; NAS 1.26:172269) Avail: NTIS HC A03/MF A01 CSCL 11D

The fundamental mechanics of delamination in fiber composite laminates is studied. Mathematical formulation of the problem is based on laminate anisotropic elasticity theory and interlaminar fracture mechanics concepts. Stress singularities and complete solution structures associated with general composite delaminations are determined. For a fully open delamination with traction-free surfaces, oscillatory stress singularities always appear, leading to physically inadmissible field solutions. A refined model is introduced by considering a prtially closed delamination with crack surfaces in finite-length contact. Stress singularities associated with a partially closed delamination having frictional crack-surface contact are determined, and are found to be diferent from the inverse square-root one of the frictionless-contact case. In the case of a delamination with very small area of crack closure, a simplified model having a square-root stress singularity is employed by taking the limit of the partially closed delamination. The possible presence of logarithmic-type stress singularity is examined; no logarithmic singularity of any kind is found in the composite delamination problem. Numerical examples of dominant stress singularities are shown for delaminations having crack-tip closure with different frictional coefficients between general (1) and (2) graphite-epoxy composites. M.G.

N84-13222*# Illinois Univ., Urbana. Dept. of Theoretical and Applied Mechanics.
THE MECHANICS OF DELAMINATION IN FIBER-REINFORCED COMPOSITE MATERIALS. PART 2: DELAMINATION BEHAVIOR AND FRACTURE MECHANICS PARAMETERS Final Report
S. S. Wang and I. Choi Nov. 1983 61 p refs 2 Vol.
(Contract NAG1-286)
(NASA-CR-172270; NAS 1.26:172270) Avail: NTIS HC A04/MF A01 CSCL 11D

Based on theories of laminate anisotropic elasticity and interlaminar fracture, the complete solution structure associated with a composite delamination is determined. Fracture mechanics parameters characterizing the interlaminar crack behavior are defined from asymptotic stress solutions for delaminations with different crack-tip deformation configurations. A numerical method employing singular finite elements is developed to study delaminations in fiber composites with any arbitrary combinations of lamination, material, geometric, and crack variables. The special finite elements include the exact delamination stress singularity in its formulation. The method is shown to be computationally accurate and efficient, and operationally simple. To illustrate the basic nature of composite delamination, solutions are shown for edge-delaminated (0/-0/-0/0) and (+ or - 0/+ or - 0/90/90 deg) graphite-epoxy systems under uniform axial extenstion. Three-dimensional crack-tip stress intensity factors, associated energy release rates, and delamination crack-closure are determined for each individual case. The basic mechanics and mechanisms of composite delamination are studied, and fundamental characteristics unique to recently proposed tests for interlaminar fracture toughness of fiber composite laminates are examined. M.G.

N84-13223*# Lockheed-California Co., Burbank.
FLIGHT SERVICE EVALUATION OF ADVANCED COMPOSITE AILERONS ON THE L-1011 TRANSPORT AIRCRAFT Annual Report
R. H. Stone Hampton, Va. NASA. Langley Research Center Sep. 1983 11 p refs
(Contract NAS1-15069)
(NASA-CR-172246; NAS 1.26:172246; LR-30555; AR-1) Avail: NTIS HC A02/MF A01 CSCL 11D

Flight service evaluation of composite inboard ailerons on the L-1011 are covered. Four shipsets of graphite/epoxy composite inboard ailerons were installed on L-1011 aircraft for this maintenance evaluation program. These include two Delta aircraft and two TWA aircraft. A fifth shipset of composite ailerons were installed in 1980 on Lockheed's flight test L-1011. A visual inspection was also conducted on these components. No visible damage was observed on any of the composite ailerons, and no maintenance action has occurred on any of the parts except for repainting of areas with paint loss. Flight hours on the airline components at the time of inspection ranged from 2886 to 4190 hours, after approximately 1 year of service. Author

N84-13224*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
INHYD: COMPUTER CODE FOR INTRAPLY HYBRID COMPOSITE DESIGN. A USERS MANUAL
Christos C. Chamis and John H. Sinclair Dec. 1983 41 p refs
(NASA-TP-2239; E-1755; NAS 1.60:2239) Avail: NTIS HC A03/MF A01 CSCL 11D

A computer program (INHYD) was developed for intraply hybrid composite design. A users manual for INHYD is presented. In INHYD embodies several composite micromechanics theories, intraply hybrid composite theories, and an integrated hygro-thermomechanical theory. The INHYD can be run in both interactive and batch modes. It has considerable flexibility and capability, which the user can exercise through several options. These options are demonstrated through appropriate INHYD runs in the manual. S.C.L.

N84-13225# Southwest Research Inst., San Antonio, Tex.
INTUMESCENT REACTION MECHANISMS: AN ANALYTIC MODEL Final Report, Jul. 1981 - Mar. 1983
Charles E. Anderson, Jr. and Donna K. Wauters May 1983 119 p
(Contract N62269-81-C-0246)
(AD-A132586; SwRI-6648/1; NADC-82211-60) Avail: NTIS

HC A06/MF A01 CSCL 19/1

Intumescent coatings are used to protect a substrate, such as warheads, from heat sources, e.g., fires. When subjected to heat, various mechanisms are activated to dissipate the incident heat. Characteristic of intumescent systems is the evolution of gases in a pyrolysis zone which causes the coating to expand or inflate, i.e., intumesce. A char is formed which is generally graphitic and resistant to burning, and which also acts as a further thermal barrier because of its low thermal conductivity. A mathematical model has been developed which describes the various physical processes by considering mass and energy control volumes. Expansion is explicitly accounted for by assuming it to be a function of mass loss. Thermodynamic data from thermogravimetric analysis and differential scanning calorimeter characterizes the chemical constituents of the coating. A computer program has been written to solve the system of equations, with appropriate boundary conditions, as a function of time. Experimentally determined parameters such as mass loss as a function of temperature requires a Lagrangian formulation, but the computational grid is rezoned after each time step to re-establish an Eulerian grid for numerical accuracy in the difference equations. GRA

N84-13226# Office of Naval Research, London (England).
FIBER COMPOSITE MATERIALS RESEARCH IN THE UK: ASSESSMENT REPORT
Tsu-Wei Chou 24 Jun. 1983 6 p
(AD-A132386; ONRL-R-6-83) Avail: NTIS HC A02/MF A01 CSCL 11/4

This report examines the status of basic research of fiber composites in the UK. The information is based on interviews at 15 universities, governmental laboratories, and industrial companies. Author (GRA)

N84-13227# Naval Surface Weapons Center, White Oak, Md.
HIGH ALTITUDE AERODYNAMIC TESTS WITH SIMULATED HEAT-SHIELD OUTGASSING Final Report, Jan. - Oct. 1982
Charles Fiscina, Robert L. P. Voisinet, Eric R. Hedlund, and Mark M. Roberts 1 Dec. 1982 142 p
(J0094)
(AD-A132078; AD-E750769; NSWC/MP-82-572) Avail: NTIS HC A07/MF A01 CSCL 20/4

This report presents the results from the High Altitude Side Force Test conducted in the NSWC Hypervelocity Wind Tunnel at Mach 14. Test objectives were to provide static force and moment data as well as pressure and heat transfer distributions on typical reentry configurations with asymmetric boundary layer outgassing. The results include normal force and moment, yaw force and moment, surface pressures and surface heat transfer rate on both 7 degree and 9 degree blunt cone models. These models incorporated a circumferentially asymmetric outgassing distribution. GRA

N84-13228# California Univ., Livermore. Lawrence Livermore Lab.
OVERVIEW OF COMPOSITES CAPABILITY AT LAWRENCE LIVERMORE NATIONAL LABORATORY
Jay K. Lepper 30 Aug. 1983 21 p refs
(Contract W-7405-eng-48)
(DE84-001086; UCID-19881) Avail: NTIS HC A02/MF A01

Polymer matrix fiber composite research and development activities at the Lawrence Livermore National Laboratory (LLNL) are discussed. LLNL has a active multidisciplined team investigating all aspects of polymer matrix fiber composites. This is a unique national resource because it is a total capability from the synthesis of new materials to the manufacture of final products. Research and development efforts concentrated on high performance structural composites. The materials are used in critical components requiring service reliability certifications of from 10(+3) to 10(+6) failure probabilities. Many of these components are designed to function in severe service environments for more than twenty-five years. The approach to accomplishing these objectives is to establish a very large and sound data base. Using this data base a fundamental understanding of glass, graphite, and aramid fibers, epoxy and polyimide matrices, and their high performance structural composites was developed. DOE

N84-13229# Bendix Corp., Kansas City, Mo.
CONTINUOUS PLASMA TREATMENT AND RESIN IMPREGNATION OF A HIGH-STRENGTH FIBER MATERIAL
J. S. Tira Sep. 1983 28 p refs
(Contract DE-AC04-76DP-00613)
(DE84-000314; BDX-613-2983) Avail: NTIS HC A03/MF A01

A system was developed for the continuous plasma treatment of fibrous, reinforcing materials used in composites. Data are presented on the removal of moisture from Kevlar 49 Aramid by the use of argon and zero air plasma. Adhesion test results with plasma-treated, unidirectional Kevlar 49/epoxy laminates showed an improvement in adhesion ranging from 1.4 to 3.7 times, as reported by the plasma treatment effectiveness parameter. Limited tensile testing of resin-impregnated yarn showed no catastropic failure from plasma treatment. DOE

N84-13230# California Univ., Livermore. Lawrence Livermore Lab.
STATISTICAL ANALYSIS OF KEVLAR 49/EPOXY COMPOSITE STRESS-RUPTURE DATA
Ronald E. Glaser Sep. 1983 79 p refs
(Contract W-7405-eng-48)
(DE84-000516; UCID-19849) Avail: NTIS HC A05/MF A01

Statistical analyses are presented for stress-rupture data sets involving Kevlar 49/epoxy strands and NASA Kevlar 49/epoxy spherical pressure vessels subjected to sustained loading. Raw data, summarized inferences, and figures are included. DOE

N84-13231# Mound Lab., Miamisburg, Ohio.
CHARACTERIZATION OF GLASS-FILLED ENGINEERING THERMOPLASTIC COMPOSITES
Ruth B. Whitaker, Allan B. Nease, and Richard O. Yelton 1983 7 p refs Presented at the 12th North Am. Thermal Anal. Soc. and 38th Calorimetry Conf., Williamsburg, Va., 25 Sep. 1983
(Contract DE-AC04-76DP-00053)
(DE84-000361; MLM-3106(OP); CONF-830976-4) Avail: NTIS HC A02/MF A01

Characterization of three engineering thermoplastic (TP) materials was carried out to assess suitability for Mound applications: Poly(etheretherketone) (PEEK), Poly(etherimide) PEI), and Poly(ethersulfone) (PES). Analyses included: thermogravimetric (TG), thermomechanical (TMA), direct probe/mass spectroscopy (DIP/MS), Fourier transform infrared spectroscopy (FT-IR), and other chemical analyses. Both neat and glass-filled PEEK and PES were studied: only unfilled PET was examined. Thermogravimetric analysis of the three TP's in showed that all were greater than or equal to 5250C in decomposition onset temperature. Both glass-filled PEEK and PEI showed < 1% weight loss in the melt after two hours. TMA analyses were used to determine expansion coefficients below T sub g for all three TP's. The glass-filled PEEK exhibited a low temperature (approx. 60 to 700 C) transition below T sub g (approx. 1500 C) on the first TMA runs. This disappeared on subsequent TMA runs and did not reappear on aging/RT. DIP/MS analyses showed both water and phenyl sulfone to be present in RES and PEEK. DOE

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N84-13232 Washington Univ., Seattle.
REVERSE COMBUSTION ALONG CONSTANT GEOMETRY FISSURES IN HETEROGENEOUS FUELS Ph.D. Thesis
Dwayne Marvin Shearer 1983 228 p

Avail: Univ. Microfilms Order No. DA8312171

Investigation of reverse combustion along fissures in solid fuel is motivated by the potential application of reverse combustion as a preliminary step to underground coal gasification. Past laboratory scale experimental modeling efforts with wood and coal are reviewed and new experiments with plexiglass and paraffin saturated firebrick are reported. For the simplified case of fissures with no wall regression in the combustion region an approximate theory is presented. The rate of propagation is determined by equating the reactant residence time with the characteristic chemical reaction time in the reacting region of the fissure. A fuel rich stability requirement leads to upper and lower limits of opposed flow velocity for combustion wave propagation. The approximate theory is in reasonable agreement with paraffin saturated firebrick experiment results. An estimate of the propagation rate is also presented based on a numerical model. Dissert. Abstr.

N84-13233# National Physical Research Lab., Pretoria (South Africa). Materials Characterization Div.

SPECTROGRAPHIC INVESTIGATION OF GOLD BY GRIMM LAMP

N. P. Ferreira and I. L. vanMaarseveen Jul. 1982 22 p refs
(CSIR-SR-283; ISBN-0-7988-2520-0) Avail: NTIS HC A02/MF A01

The applicability of the Grimm-type low pressure electrical discharge, for the analysis of different gold alloys was investigated. A correction method was developed by Jager to compensate for the variation in sputtering rate due to changes in sample composition. Second and third order polynomials containing 20 terms were used to fit calibration curves of corrected intensities versus elemental concentrations. The best precision obtained for gold was 0,122% relative standard deviation on a concentration of 80%. The accuracy obtained for gold, silver, copper and lead using 15 different standards, is reflected in the best average deviation from the accepted value, together with the corresponding concentration ranges of the elements. Author

N84-13234# Chemical Engineering Research Group, Pretoria (South Africa).

FISCHER-TROPSCH SYNTHESIS IN SLURRY REACTORS: SUMMARY AND ANALYSIS OF THE STATE OF THE ART

D. S. vanVuureen Aug. 1982 23 p refs
(CSIR-CENG-432; ISBN-0-7988-2559-6) Avail: NTIS HC A02/MF A01

An analysis of the advantages of Fischer-Tropsch slurry reactors confirms that this reactor type is preferable for high boiling point liquid products and synthesis gas of low HZ;CO ratio. There is some evidence that it is also the optimum reactor type for the synthesis of gaseous or low boiling point liquid products and provides versatility in product spectrum. Scrutiny of the available reactor design data has revealed serious discrepancies and gaps in existing knowledge; recommendations are made for research to rectify this situation. Author

N84-13235# Chemical Engineering Research Group, Pretoria (South Africa).

THE EFFECT OF SURFACE CHARGE ON THE RHEOLOGY OF CONCENTRATED AQUEOUS QUARTZ SUSPENSIONS

K. J. Scott May 1982 26 p refs
(CSIR-CENG-423; ISBN-0-7988-2419-0) Avail: NTIS HC A03/MF A01

The viscosity of a suspension is determined not only by the medium and the particle concentration but also by the degree of aggregation of the primary particles. When these are well dispersed, either by the repulsive forces owing to high zeta potentials or by high shear (velocity gradients), the rheological behavior of the suspension is newtonian. The viscosity then approximates that of a suspension of spherical particles. Aggregation, whether a result of low zeta potential or the close proximity of the particles at high concentration, leads to increased viscosity and to such non-Newtonian phenomena as yield stress, shear thinning and, at extremely low shear to a time dependent strong increase inviscosity. The relatively high viscosity of a suspension of aggregates is caused by entrapment of fluid by the aggregates which makes the effective volumetric concentration of aggregates higher than that of the primary particles. The effective concentration of the aggregates is estimated from the maximum attainable concentration which is determined in a centrifuge experiment. Author

N84-13236# Chemical Engineering Research Group, Pretoria (South Africa).

THE ROLE OF THE TETRAPROPYLAMMONIUM TEMPLATE IN THE SYNTHESIS OF ZEOLITE ZSM-5

M. G. Howden Mar. 1983 20 p refs
(CSIR-CENG-413; ISBN-0-7988-2410-7) Avail: NTIS HC A02/MF A01

Zeolite ZSM-5 was prepared from an aqueous solution containing colloidal silica, sodium aluminate, sodium hydroxide and tetrapylammonium bromide; the tetrapropylammonium units acting as templates. Thus sodium ions are present and form the exchangeable cations in preference to the tetrapropylammonium cations. The templates are located at the channel intersections, filling about 70% of them. To obtain high yields only a moderate excess of template is required in the reaction mixture. Author

N84-13237# Minnesota Univ., Minneapolis. Dept. of Chemistry.

POSITIVE ION-MOLECULE REACTIONS IN OCS/HYDROCARBON MIXTURES

David A. Weil, I. Platzner, Larry L. Miller, and David A. Dixon 4 Aug. 1983 16 p
(Contract N00014-80-C-0244)
(AD-A132350; AD-E950428) Avail: NTIS HC A02/MF A01 CSCL 07/3

The positive ion-molecule reactions of OCS have been investigated in an ion cyclotron resonance spectrometer. A variety of reactions in OCS/hydrocarbon mixtures have been investigated for C1-C4 hydrocarbons which are alkanes, alkenes and alkynes. The formation of organosulfur ions is found in reactions in OCS/hydrocarbon (Cn) mixtures with $n<4$. Formation of organosulfur ions is observed from hydrocarbon ions reacting with OCS and OCS+ and S+ reacting with the hydrocarbons. The proton affinty of OCS has been determined to be 168 + or - 5 kcal/mol while that of CS2 is measured to be 179 + or - kcal/mol. Comparison with the proton affinity of CO2 shows that the proton affinity increases as sulfur is substituted for oxygen. Author (GRA)

N84-13238# Army Armament Research and Development Command, Dover, N. J. Large Caliber Weapon Systems Lab.

N(2) AND CO VIBRATIONAL CARS AND h(2) ROTATIONAL CARS SPECTROSCOPY OF CH(4)-N(2)O FLAMES Final Report

Kenneth Aron, L. E. Harris, and Joanne Fendell Aug. 1983 36 p
(DA Proj. 1L1-61122-AH-60)
(AD-A132234; AD-E401065; ARLCD-TR-83033) Avail: NTIS HC A03/MF A01 CSCL 20/6

Broadband CARS (coherent anti-Stokes Raman scattering) spectra of N(2) and CO were obtained from the post-flame gases of rich CH(4)-N(2)O flames by the use of the nonplanar BOX-CARS technique. The temperature and concentration of both N(2) and CO in these flames, estimated from CARS spectra with the aid of model calculations, agreed with standard thermochemical predictions. In addition, several pure rotational H(2) CARS transitions, most of which had previously been unobserved, were seen in several spectral regions, most notably in both the CO and NO CARS regions. These observations are important in future modeling of CARS data. GRA

N84-13239# Sandia Labs., Albuquerque, N. Mex.

QUANTITATIVE DETERMINATION OF THE INTENSTITIES OF KNOWN COMPONENTS IN SPECTRA OBTAINED FROM SURFACE ANALYTICAL TECHNIQUES

G. C. Nelson 1983 22 p refs Presented at the American Vacuum Society Symp., Boston, 31 Oct. 1983
(DE84-000926; SAND-83-2094C; CONF-831011-2) Avail: NTIS HC A02/MF A01

Linear least squares methods were used to quantitatively

decompose experimental data obtained from surface analytical techniques into its separate components. The mathematical procedure for accomplishing this is described and examples are given of the use of this method with data obtained from Auger Electron Spectroscopy (both N(E) and derivative), X-ray Photoelectron Spectroscopy, and Low-Energy Ion Scattering Spectroscopy. The requirements on the quality of the data are discussed. DOE

N84-13240# Dynamics Technology, Inc., Torrance, Calif.
PDF: A COMPUTER PROGRAM FOR CALCULATION OF TURBULENT COMBUSTION UTILIZING A PROBABILTY DENSITY FUNCTION (PDF) APPROACH
John J. Wormeck Sep. 1983 119 p refs
(Contract DE-AC03-81ER-10964)
(DE84-000999; DOE/ER-10964/T1; DT-8152-03) Avail: NTIS HC A06/MF A01

A detailed description and user's guide for a collection of FORTRAN-77 subroutine subprograms which enable the extension of any existing hydrodynamic computer code to the calculation of multi-dimensional, laminar or turbulent flows with chemically complex equilibrium stationary states is presented. The version of PDF described is limited to adiabatic, homogeneous, ideal gas phase chemical equilibrium. An example calculation is given for a parabolic flow for mixing and combustion of initially unmixed methane and air in a simple shear flow. DOE

N84-13241# Argonne National Lab., Ill. Materials Science and Technology Div.
ELECTRON-ENERGY-LOSS SPECTRAL LIBRARY AND ITS APPLICATION TO MATERIALS SCIENCE
Nestor J. Zaluzec Sep. 1983 5 p refs Presented at the 10th Intern. Congr. on X-ray Optics and Microanal., Toulouse, 5-9 Sep. 1983
(Contract W-31-109-eng-38)
(DE84-000588; CONF-8309133-2) Avail: NTIS HC A02/MF A01

An electron energy loss spectral library can be an invaluable tool in materials research from a fundamental as well as a practical standpoint. Although it will not alleviate all the complications associated with quantification, this type of library can help to elucidate details of spectral profiles previously found intractable. DOE

N84-13242# Georgia Inst. of Tech., Atlanta. School of Chemistry.
CHARACTERIZATION OF HIGH-TEMPERATURE VAPOR-PHASE SPECIES AND VAPOR-SOLID INTERACTIONS OF IMPORT TO COMBUSTION AND GASIFICATION PROCESSES IN THE ENERGY TECHNOLOGIES Quarterly Technical Progress Report, 14 Apr. - 15 Jul. 1983
J. L. Gole 15 Jul. 1983 20 p ref
(Contract DE-AC21-81MC-16537)
(DE83-015166; DOE/MC-16537/T6; QTPR-7) Avail: NTIS HC A02/MF A01

Bond energies and spectra for the alkali hydroxides and oxides were studied. Experimental configurations for generating intense, stable, and long lasting chemiluminescent emission from the alkali hydroxides NaOH and KOH and the alkali oxides NaO and KO were discussed. The first electronic emission spectra for these compounds were generated and are being studied in the laboratory. Commensurate with this effort is the study of extensive particulate formation which appears to be pathological to the alkali hydroxide and oxide systems. This particulate matter, formed in an extremely efficient manner in the oxidation process, is studied using a number of techniques (low temperature mass spectrometry, EPR spectrometry, and Raman spectroscopy). Initial efforts to obtain an X-ray powder pattern and a high temperature quadrupole mass spectrum have been instituted. Sodium cluster oxidation studies focused on the dsire to observe emission from highly exothermic processes which characterize the Na(x)-SO2-Cl2 system. In addition, refinements of studies of silicon monoxide formation which complement previous studies were carried out. From these studies the bond energy of SiO was confirmed from a purely spectroscopic measurement thus complementing and confirming the mass spectrometric determinations. DOE

N84-13243# Aerospace Corp., Los Angeles, Calif. Chemistry and Physics Lab.
LASER-INDUCED FLUORESCENCE SPECTROSCOPY FOR IMPROVED CHEMICAL ANALYSIS Progress Report, 1978 - 1983
Jerry A. Gelbwachs Sep. 1983 14 p refs
(Contract DE-AT03-76ER-71013)
(DE84-000629; DOE/ER-71013/T3) Avail: NTIS HC A02/MF A01

This report summarizes the progress achieved over the past five years in the laser induced fluorescence spectroscopy (LIPS) for improved chemical analysis program. Initial efforts yielded significantly lower detection limits for trace elemental analysis by the use of both CW and pulsed laser excitations. New methods of LIPS were developed that were shown to overcome many of the traditional limitations to LIPS techniques. LIPS methods have been applied to yield fundamental scientific data that further the understanding of forces between atoms and other atoms and molecules. In recent work, two photon ionization was combined with LIPS and applied, for the first time, to the study of energy transfer in ions. DOE

N84-13244# Dynamics Technology, Inc., Torrance, Calif.
CI: A COMPUTER PROGRAM FOR CALCULATION OF CONTACT INDEXES WHICH WILL CORRECT REACTION RATES EVALUATED BY MEAN QUANTITIES DURING SIMULATION OF TURBULENT COMBUSTION
John J. Wormeck Sep. 1983 120 p refs
(Contract DE-AC03-81ER-10964)
(DE84-001000; DOE/ER-109664/T3; DT-8152-04) Avail: NTIS HC A06/MF A01

This report contains a detailed description and user's guide for a collection of FORTRAN-77 subroutine subprograms which compute the contact indexes for a general reaction mechanism. Such indexes will correct the mean formation rate of species when evaluated in terms of time-mean values of temperature and concentrations. Example calculations are presented for elliptic and parabolic reacting flows which consider both mixing-limited and kinetically-limited combustion. DOE

N84-13245# California Univ., Berkeley. Lawrence Berkeley Lab.
APPLICATION OF SURFACE-PHYSICS TECHNIQUES TO THE STUDY OF ELECTROCHEMICAL SYSTEMS
Philip N. Ross and Frederick T. Wagner Jul. 1983 59 p refs Presented at the 34th ISE Meeting, Erlanger, West Germany, 18 Sep. 1983
(Contract DE-AC03-76SF-00098)
(DE84-000957; LBL-16235; CONF-830999-2) Avail: NTIS HC A04/MF A01

The experimental methods that have evolved out of several years of effort at different laboratories to study emersed electrodes by UHV techniques that probe the outer surface are discussed. The problem of electrode surface structure determination by electron diffraction methods is also discussed, and examples are given of other types of studies that can be done with such methods. The apparatus for UHV analysis of emersed electrodes is described, and the emersion of metal electrodes is explained. Selected results using directly coupled systems are given for adsorbed on emersed electrodes studied by electron spectroscopy and thermal desorption and for structure determination for emersed electrode surfaces using low energy electron diffraction. DOE

N84-13246# Los Alamos Scientific Lab., N. Mex. Chemistry Div.
SURFACE SCIENCE STUDY OF SELECTIVE ETHYLENE EPOXIDATION CATALYZED BY THE Ag(110) SURFACE: STRUCTURAL SENSITIVITY
Charles T. Campbell 1983 17 p refs Presented at the Am. Vacuum Soc. Meeting, Boston, 1-4 Nov. 1983

(Contract W-7405-eng-36)
(DE84-001324; LA-UR-83-2689; CONF-831171-5) Avail: NTIS HC A02/MF A01

The selective oxidation of ethylene to ethylene epoxide (C2H4 + 1/2 O2 (FEMALE) C2H4O) over Ag is the simplest example of kinetically-controlled, selective heterogeneous catalysis. The steady-state kinetics and selectivity of this reaction for the first time on a clean, well-characterized Ag(110) surface by using a special apparatus which allows rapid (approx. 20 s) transfer between a high-pressure catalytic microreactor and an ultrahigh vacuum surface analysis (AES, XPS, LEED, TDS) chamber are studied. The effects of temperature and reactant pressures upon the rate and selectivity are virtually identical on Ag(110) and supported, high-surface-area Ag catalysts. The absolute specific rate (per Ag surface atom) is, however, some 100-fold higher for Ag(110) than for high-surface-area catalysts. This is related to the well-known structural sensitivity of this reaction. It is postulated that a small percentage of (110) planes (or (110)-like sites) are responsible for most of the catalytic activity of high-surface-area catalysts. The high activity of the (110) plane is attributed to its high sticking probability for dissociative oxygen adsorption, since the rate of ethylene epoxidation is shown in a related work to be proportional to the coverage of atomically adsorbed oxygen at constant temperature and ethylene pressure. DOE

N84-13247# California Univ., Livermore. Lawrence Livermore Lab.
VACUUM OUTGASSING OF VARIOUS MATERIALS
E. D. Erikson, T. G. Beat, D. D. Berger, and B. A. Frazier 28 Sep. 1983 27 p refs Presented at the Am. Vacuum Soc. Symp., Boston, 24-28 Oct. 1983
(Contract W-7405-eng-48)
(DE84-001449; UCRL-89299; CONF-831011-3) Avail: NTIS HC A03/MF A01

A gas analytical system for measuring the evolved gases from materials during vacuum degassing is discussed. The outgassing data are based upon the throughput measurement and a computer-controlled quadrupole mass spectrometer allows the determination of residual gas species. A variety of materials were tested in the as received condition at room-temperature vacuum exposure. Test results are presented for some unusual materials such as chlorinated polyvinyl chloride (CPVC), low-density carbon foam and Monel knitted wire mesh (both of which could be used for the attenuation of electromagnetic or radio frequency interference), polyethylene (in the form of black pipe, various thicknesses of sheet, or as an electrostatically applied coating to metal substrates), as well as Parylene-N conformal coatings applied to either polyethylene or stainless steel substrates. DOE

N84-13248# California Univ., Berkeley. Lawrence Berkeley Lab. Applied Science Div.
SELECTIVE CATALYTIC HYDROGENATION OF POLYNUCLEAR HETEROAROMATIC NITROGEN COMPOUNDS WITH POLYMER-SUPPORTED TRANSITION-METAL COMPOUNDS
Richard H. Fish and Heinz Heinemann Jul. 1983 10 p refs Presented at the 7th Ann. EPRI Contractors Conf. on Coal Liquefaction, Palo Alto, Calif., 11-3 May 1983
(Contract DE-AC03-76SF-00098)
(DE84-001326; LBL-15985; CONF-830549-2) Avail: NTIS HC A02/MF A01

The selective catalytic hydrogenation of model coal compounds such as quinoline, 5,6- and 7,8-benzoquinoline, acridine and phenanthridine were studied using transition metal catalysts supported on 2% or 20% cross-linked phosphinated divinylbenzene-polystyrene beads. In all cases, only the nitrogen heterocyclic ring in the above-mentioned polynuclear heteroaromatic nitrogen compounds was reduced, while it was found that the 2% cross-linked beads were three times more active per metal atom than their 20% cross-linked analogues and forty times more active than its homogeneous counterpart using quinoline as the model coal compound and polymer-supported Wilkinson's catalyst. A discussion of these results are presented along with data to show; clearly, the potential of these polymer-supported catalysts in the selective reduction of polynuclear heteroaromatic nitrogen compounds in the presence of known coal liquid constituents such as pyrene, tetralin, methylnaphthalenes, cresols and 2-methylpyridine. DOE

N84-13249# Electrochemical Technology Corp., Seattle, Wash.
DEVELOPMENT OF MULTICOMPONENT TRANSPORT THEORY AND TRANSPORT DATA FOR MEMBRANES IN CONCENTRATED ELECTROLYTES Final Report
R. T. Ruggeri and T. R. Beck Jul. 1983 64 p refs
(Contract DE-AC03-76SF-00098)
(DE84-001846; LBL-16557) Avail: NTIS HC A04/MF A01

The theory and measurement techniques of multicomponent mass transfer in membranes is discussed. The results of the early experiments suggested that the transport properties might be accurately determined using a radiotracer method, and that certain transport properties of Nafion might depend strongly on the applied current density. Therefore, a program was initiated to investigate the effects of current density on the membrane transport properties using a radiotracer technique. The solubilities of sodium and chloride ions in Nafion 7-1100 were also determined. It is concluded that the radiotracer method is a viable means of determining multiple transport numbers and self-permeability coefficients in a single experiment. Further, the method is at least as accurate as the more conventional Hittorf method. It is apparent that these radiotracer methods can be effectively utilized in the investigation of multicomponent mass transfer in a wide variety of membranes. DOE

N84-13250# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
MOLECULAR BASIS FOR LOCAL COMPOSITIONS IN LIQUID-MIXTURE MODELS
Y. Hu, E. G. Azevedo, and J. M. Prausnitz Apr. 1983 20 p refs Presented at the 3rd Intern. Conf. on Fluid Properties and Phase Equilibria for Chem. Process Design, Atlanta, 10-15 Apr. 1983
(Contract DE-AC03-76SF-00098)
(DE83-016804; LBL-16449; CONF-8304116-1) Avail: NTIS HC A02/MF A01

The local composition concept is examined critically. When a general local composition model is subjected to different constraints, different forms are obtained, corresponding to those presented earlier by Wilson or Renon or Abrams or Guggenheim. For a simple mixture, a physically meaningful constraint gives a one parameter model whose properties are obtained from the Lennard-Jones potential. For this model, the calculated excess Gibbs energy and calculated local compositions are in good agreement with results from Monte Carlo data and with results from perturbation theory. Local composition models, when developed with care, have physical significance as well as engineering utility. DOE

N84-13251# California Univ., Berkeley. Lawrence Berkeley Lab.
DISSOCIATIVE IONIZATION OF LIQUID WATER INDUCED BY VIBRATIONAL OVERTONE EXCITATION Ph.D. Thesis
Wesley Charles Natzle Mar. 1983 269 p refs
(Contract DE-AC03-76SF-00098)
(DE83-017739; LBL-15786) Avail: NTIS HC A12/MF A01

Photochemistry of vibrationally activated ground electronic state liquid water to produce H( ) and OH(+) ions was initiated by pulsed, single photon excitation of overtone and combination transitions. Transient conductivity measurements were used to determine quantum yields as a function of photon energy, isotopic composition, and temperature. The equilibrium relaxation rate following perturbation by the vibrationally activated reaction was also measured as a function of temperature reaction and isotopic composition. In H2O, the quantum yield at 283 + or - 1 K varies from 2 x 10(+9) to 4 x 10(+5) for wave numbers between 7605 and 18140 cm(+1). In D20, the dependence of quantum yield on wavelength has the same qualitative shape as for H2O, but is shifted to lower quantum yields. The position of a minimum in the quantum yield versus hydrogen mole fraction curve is consistent with a lower quantum yield for excitation of HOD in D2O than for excitation of D2O. The ionic recombination distance

of 5.8 + or - 0.5 A is constant within experimental error with temperature in H2O and with isotopic composition at 25 + or - 10C. DOE

N84-13252# California Univ., Livermore. Lawrence Livermore Lab.
ELECTROLYTIC GETTERING OF TRITIUS FROM AIR
P. C. Souers, R. T. Tsugawa, and C. G. Stevens 1983 18 p refs Presented at the Am. Vacuum Soc. Meeting, Boston, 1-4 Nov. 1983
(Contract W-7405-eng-48)
(DE84-000174; UCRL-89189; CONF-831171-3) Avail: NTIS HC A02/MF A01

Ninety percent of 1 part per million tritium gas in air of 25% to 35% humidity was removed by the dc electrical action of the solid proton electrolyte hydrogen uranyl phosphate (HUP). Gettering takes 5 to 24 hours for a 1 cm(2) HUP disc at 2 to 4 V in a static, 1200 cc gas volume. Hydrogen gas may be used to flush captured tritium through the HUP. Liquid water leaches out the tritium but water vapor is ineffective. This technique promises an alternative to the conventional catalyst/zeolite method. DOE

N84-13253# California Univ., Berkeley. Lawrence Berkeley Lab. Physics, Computer Science and Mathematics Div.
PROBLEMS AND PROSPECTS IN STRANGE BARYON SPECTROSCOPY
R. D. Tripp Aug. 1983 8 p refs Presented at the 3rd LAMPF 2 Workshop, Los Alamos, N. Mex., 18-22 Jul. 1983
(Contract DE-AC03-76SF-00098)
(DE83-018119; LBL-16596; CONF-830798-4) Avail: NTIS HC A02/MF A01

The Y resonances studied by formation experiments has long suffered from deficiencies of available K(+) beams, both in intensity and purity. A typical single stage separated K(+) beam of 750 MeV/c has at BNL or CERN an intensity of about 10(5) K(+)/pulse with a ratio of K(+) to contaminating (LC OMEGA)(+), (SIGMA)(+), and e(+) of 1:10. At a kaon factory the K(+) yield is expected to be several orders of magnitude higher. Trading intensity for purity by employing two stages of separation and/or improved beam optics, expected to obtain an intensity of 10(6) K(+)/sec, unencumbered by the high contamination that would otherwise torture the apparatus. Detector requirements are considered. DOE

N84-13254# Oak Ridge National Lab., Tenn. Chemistry Div.
IN-SITU PHOTOACOUSTIC SPECTROMETRY FOR CORROSION STUDIES
C. E. Vallet and Gilbert M. Brown 1983 2 p refs Presented at the Electrochem. Soc. Fall Meeting, Washington, D.C., 9 Oct. 1983
(Contract W-7405-eng-26)
(DE84-001994; CONF-831086-6) Avail: NTIS HC A02/MF A01

The mechanism of formation and breakdown of passive oxide films, with consequent implications for localized corrosion was tested by in situ photoacoustic spectroscopy coupled with electrochemical measurements. It is shown that detectable acoustic signals can be obtained with an illumination intensity of the electrode which does not produce a significant photoelectrochemical effect. DOE

N84-13255# Los Alamos Scientific Lab., N. Mex. Center for Nonlinear Studies and Theoretical Div.
FLAME FRONTS WITH COMPLEX CHEMICAL NETWORKS
Paul C. Fife (Arizona Univ.) and Basil Nichols 1983 38 p refs Presented at the Fronts, Interfaces and Pattern Conf., Los Alamos, N. Mex., 2 May 1983
(Contracts W-7405-eng-36; KC-04-02-01; Grant NSF MCS-82-02056)
(DE84-001175; LA-UR-83-2886; CONF-8305110-4) Avail: NTIS HC A03/MF A01

A systematic method to reduce the detailed chemistry in the limit of high activation energy asymptotics for laminar flame fronts with general complex chemistry networks is presented. The method on a global multistep hydrocarbon model is outlined. Generic flame profile structures are discussed and extensions to networks with zero activation energies are illustrated. DOE

N84-13256# National Bureau of Standards, Washington, D.C. National Measurement Lab.
THERMODYNAMIC SURFACE FOR WATER: THE FORMULATION AND COMPUTER PROGRAMS
Lester Haar, John S. Gallagher, and George S. Kell (National Research Council of Canada, Ottawa) Jun. 1983 39 p refs
(PB83-249789; NBSIR-81-2253) Avail: NTIS HC A03/MF A01 CSCL 07D

A FORTRAN 77 program is given with which thermodynamic properties for liquid and gaseous states for water can be calculated for the temperature and pressure range, 250 < or = T(K) < or = 4000 and O < or = P < or = Pmax, where Pmax is the lesser of the pressure of melting ice or 4 G Pa (40,000 bar). The program yields values for enthalpy, entropy, heat capacity, speed of sound, Joule-Thomson Coef., second virial coef., isothermal compressibility coef., coef. of thermal expansion, and PoT relations that are everywhere in accord with accurate data for water. Included is a brief outline of the derivation of the equations. GRA

N84-13257# Auburn Univ., Ala.
PHASE AND COMPRESSION BEHAVIOR IN SEDIMENTATION AND THICKENING OF LIQUID-SOLID SUSPENSIONS
Timothy D. Placek 13 Jul. 1983 17 p refs
(Contract DI-14-34-0001-2101)
(PB83-249664; W83-03727; OWRT-A-086-ALA(1)) Avail: NTIS HC A02/MF A01 CSCL 07A

Theoretical work was done to allow batch settling data to be more successfully used to design continuous thickening process equipment particularly at medium to high solids concentrations. The model developed allows the mathematical description of clarifiers and thickeners operating in the compression zone regime. The data required to both validate the model as well as to compare its reliability to other currently used models were obtained. Additional experimental work was performed to investigate to what extent batch and continuous thickeners are affected by rheological variants such as shear history and surface effects as well as to consider the significance of phase behavior such as channeling. Laboratory work included the construction of a prototype continuous thickener having excellent performance characteristics as well as making refinements in the standard data collection and treatment methods. GRA

N84-13366# Building Research Inst., Tokyo (Japan).
THERMAL INSTABILITY IN TRANSIENT COMPARTMENT FIRE: AN APPROACH TO CHARACTERIZE FLASHOVER AND ESTIMATE ITS MECHANISMS
Yuji Hasemi *In its* Proc. of the 6th Joint Panel Meeting 1982 p 451-461 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

N84-13367# Building Research Inst., Tokyo (Japan).
SIMILARITY ANALYSIS OF THE FLOW CHARACTERISTICS IN DIFFUSION FLAMES
Yuji Hasemi *In its* Proc. of the 6th Joint Panel Meeting 1982 p 462-467 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

N84-13368# Seikei Univ., Tokyo (Japan). Dept. of Mechanical Engineering.
SCALING LAWS ON FIRE SPREAD
Richard I. Emori, Yasuo Iguchi, and Kozo Saito (Princeton Univ., N.J.) *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 469-495 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

N84-13370# Factory Mutual Research Corp., Norwood, Mass.
FIRE MODELING RESEARCH AT FACTORY MUTUAL
Raymond Friedman and John deRis *In* Building Research Inst.

Proc. of the 6th Joint Panel Meeting 1982 p 537-555 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

N84-13371# California Univ., Berkeley. Dept. of Mechanical Engineering.
FLAME HEIGHTS, FLAME RADIATION AND FLAME SPREAD
Patrick J. Pagni *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 556-573 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

N84-13372# National Bureau of Standards, Washington, D.C. Center for Fire Research.
RECENT PROGRESS AT NBS IN FIRE GROWTH MODELING
James Quintiere *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 574-596 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

N84-13373# Tokyo Univ. (Japan). Engineering Research Inst.
RESPONSE OF FLAME SPREAD PHENOMENA TO AMBIENT AIR STREAM VELOCITY CHANGES
Toshisuke Hirano, Kenji Sato, and Hiroaki Minami *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 597-615 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

N84-13377# Fire Research Inst., Tokyo (Japan).
DEPENDENCE OF EVOLUTION OF TOXIC GASES ON BURNING CONDITIONS
Tokio Morikawa *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 670-682 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

N84-13379# Building Research Inst., Tokyo (Japan). Testing and Evaluation Dept.
ON SMOKE CONTROL EXPERIMENTS
Toshio Yamana *In its* Proc. of the 6th Joint Panel Meeting 1982 p 700-725 (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N84-13258# British Library Lending Div., Boston Spa (England).
FORMATION OF STRUCTURE OF LOW-ALLOY STEEL INOCULATED WITH RARE-EARTH METALS AND ALKALINE-EARTH METALS
V. L. Shagalov, V. V. Khlynov, T. N. Kalmykova, M. V. Kukhtin, and B. A. Pastukhov 25 Oct. 1983 4 p Transl. into ENGLISH from Stal (USSR), v. 2, 1983 p 23-24
(BLL-M-35321) Avail: British Library Lending Div., Boston Spa, Engl.

The influence of additions of ferrocerium and silicocalcium on the structure of solidifying metal and on the morphology and nature of distribution of non-metallic inclusions was studied. A physico-chemical analysis was made of the interacting phases in the process of solidification and cooling of the liquid steel. Author

N84-13259# Electricity Council, London (England).
THE EFFECT OF THE STRUCTURE OF METALLO-ORGANIC COMPLEXES ON THE ELECTROLYTIC PRECIPITATION OF TITANIUM AND NIOBIUM FROM NONAQUEOUS ELECTROLYTES
V. V. Kuznetsov, V. P. Grigorev, S. S. Kucherenko, V. A. Kogan, and O. A. Osipov 13 Sep. 1983 9 p refs Transl. into ENGLISH from Iav. Sev. Kavkaz. Nauchn. Tsentr. Ser. Estestv. Nauk (USSR), v. 4, pt. 4, 1976 p 75-78
(BLL-OA-Trans-3070-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

The considerable attention paid to the deposition of thin films of Ti and Nb on ferrous metals is caused by the outstanding corrosion resistance and high mechanical and electrophysical (superconductivity) characteristics of these films. But the literature contains almost no data on the relationship between the structure and the physico-chemical parameters of metal complexes and the special features of discharge of the latter at the cathode. Investigations were carried out to obtain information on this problem on the basis of the purposeful synthesis of various types of complex compounds of Ti and Nb, to study their structure, and to examine the conditions for the precipitation of metal from these compounds by means of electrolysis in an organic electrolyte. Author

N84-13260# Electricity Council, London (England).
THE ELECTRODEPOSITION OF TITANIUM COATINGS
I. A. Filippova, O. S. Petenev, Z. S. Martemyanova, L. E. Ivanovskii, and A. N. Baraboshkin 13 Sep. 1983 7 p refs Transl. into ENGLISH from Tr. Inst. Elektrokhim. Uralsk. Nauchn. Tsentr. Akad. Nauk SSSR (USSR), 1974 p 49-52
(BLL-OA-Trans-3057-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

Titanium coatings on steel were obtained by the electrolysis of a molten mixture of lithium, potassium and titanium chlorides at a temperature of 4000 to 450 C. The coating adhered well to the substrate and had a texture along the axis < 11(-Z)0>, perpendicular to the substrate. The high corrosion resistance of titanium offers the prospect of the wide use of construction materials protected with titanium coatings. Many attempts were made to obtain these by the electrolysis of fused salts. However almost all this work was done at temperatures above 700 C, which cause recrystallization of the construction materials (and the deterioration in mechanical properties resulting from this) and appreciable diffusion of the titanium into the substrate. A low melting point mixture of lithium potassium and titanium chloride was used, which is electrolyzed at 400 to 450 C, for the electrodeposition of titanium. Author

N84-13261# British Library Lending Div., Boston Spa (England).
NON-UNIFORMITY OF ELASTIC MICRO-DEFORMATIONS IN AUSTENITIC STEELS
A. A. Vainshtein 25 Oct. 1983 3 p refs Transl. into ENGLISH from Izv. (USSR), v. 2, 1983 p 156-157
(BLL-M-35357-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Relationships between elastic microdeformations and macro-deformations are presented together with the coefficient of variation to estimate the non-uniformity of longitudinal microdeformations. The field of microdeformations in austenitic steels is less uniform than in pure iron or nickel. Author

N84-13262# British Library Lending Div., Boston Spa (England).
PREDICTING THE BASE PHASE IN THE CRYSTALLIZATION OF EUTECTIC ALLOYS
I. V. Gavrilin 25 Oct. 1983 10 p refs Transl. into ENGLISH from Izv. (USSR) p 35347
(BLL-M-35347-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The roles of the structural microheterogeneity of liquid eutectics and of electronic interaction of the components of a eutectic alloy in the nucleation of the solid phase in the crystallization of eutectics are considered on the basis of a modification of the flat-condenser model. Electronic interaction was found to be an important factor in the determination of the base phase when eutectic alloys crystallize. In binary eutectics, the nucleation catalyst is mainly the component having the smaller value of the effective ionization potential, and the base-phase the component with the greater. Author

N84-13263*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
GALVANIC COUPLING BETWEEN D6AC STEEL, 6061-T6

ALUMINUM, INCONEL 718 AND GRAPHITE-EPOXY COMPOSITE MATERIAL: CORROSION OCCURRENCE AND PREVENTION

Merlin D. Danford and Ralph H. Higgins Dec. 1983 18 p refs (NASA-TP-2236; NAS 1.60:2236) Avail: NTIS HC A02/MF A01 CSCL 11F

The effects of galvanic coupling between D6AC steel, 6061-T6 aluminum, Inconel 718, and graphite-epoxy composite material (G/E) in 3.5% NaCl were studied. Measurements of corrosion potentials, galvanic currents and corrosion rates of the bare metals using weight-loss methods served to establish the need for corrosion protection in cases where D6AC steel and 6061-T6 aluminum are galvanically coupled to G/E in salt water while Inconel 718 was shown to be compatible with G/E. Six tests were made to study corrosion protective methods for eliminating galvanic corrosion in the cases of D6AC steel and 6061-T6 aluminum coupled to G/E. These results indicate that, when the G/E is completely coated with paint or a paint/polyurethane resin combination, satisfactory protection of the D6AC steel is achieved with either a coat of zinc-rich primer or a primer/topcoat combination. Likewise, satisfactory corrosion protection of the aluminum is achieved by coating it with an epoxy coating system. M.G.

N84-13264*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

REPLACING CRITICAL AND STRATEGIC REFRACTORY METAL ELEMENTS IN NICKEL-BASE SUPERALLOYS

Joseph R. Stephens, Robert L. Dreshfield, and Michael W. Nathal Dec. 1983 21 p refs Presented at the 1st USA-Brazil Superalloy Conf., Araxa (Brazil), 6-13 Apr. 1984

(NASA-TM-83528; E-1894; NAS 1.15:83528) Avail: NTIS HC A02/MF A01 CSCL 11F

Because of the import status and essential nature of their use, cobalt, chromium, tantalum, and niobium were identified as strategic and critical in the aerospace industry. NASA's Conservation of Strategic Aerospace Materials (COSAM) program aims to reduce the need for strategic materials used in gas turbine engines. Technological thrusts in two major areas are under way to meet the primary objective of conserving the use of strategic materials in nickelbase superalloys. These thrusts consist of strategic element substitution and alternative material identification. The program emphasizes cooperative research teams involving NASA Lewis Research Center, universities, and industry. The adoption of refractory metals in nickel-base superalloys is summarized including their roles in mechanical strengthening and environmental resistance; current research activities under way in the COSAM Program are presented as well as research findings to date. A.R.H.

N84-13265*# Battelle Columbus Labs., Ohio.

CREEP FATIGUE OF LOW-COBALT SUPERALLOYS: WASPALLOY, PM U 700 AND WROUGHT U 700 Final Report

Brian N. Leis, Ravi Rungta, and Allen T. Hopper 1 Sep. 1983 61 p refs

(Contract NAS3-23289)

(NASA-CR-168260; NAS 1.26:168260) Avail: NTIS HC A04/MF A01 CSCL 11F

The influence of cobalt content on the high temperature creep fatigue crack initiation resistance of three primary alloys was evaluated. These were Waspalloy, Powder U 700, and Cast U 700, with cobalt contents ranging from 0 up to 17 percent. Waspalloy was studied at 538 C whereas the U 700 was studied at 760 C. Constraints of the program required investigation at a single strain range using diametral strain control. The approach was phenomenological, using standard low cycle fatigue tests involving continuous cycling tension hold cycling, compression hold cycling, and symmetric hold cycling. Cycling in the absence of or between holds was done at 0.5 Hz, whereas holds when introduced lasted 1 minute. The plan was to allocate two specimens to the continuous cycling, and one specimen to each of the hold time conditions. Data was taken to document the nature of the cracking process, the deformation response, and the resistance to cyclic loading to the formation of small cracks and to specimen separation. The influence of cobalt content on creep fatigue resistance was not judged to be very significant based on the results generated. Specific conclusions were that the hold time history dependence of the resistance is as significant as the influence of cobalt content and increased cobalt content does not produce increased creep fatigue resistance on a one to one basis. S.L.

N84-13266# Witwatersrand Univ., Johannesburg (South Africa). Dept. of Metallurgy.

BIAXIAL FATIGUE, A REVIEW OF THE LITERATURE

D. P. Spencer and G. G. Garrett Aug. 1982 42 p refs (FRP-82/17) Avail: NTIS HC A03/MF A01

Fatigue crack propagation data is conventially found by testing uniaxially loaded specimens. Most structures, however, are subject to biaxial or triaxial stress states. In these cases, it is necessary to establish how the propagation rate of a crack is affected if a stress is applied parallel to it. Despite extensive work in this field, the results at first appear to be in conflict. The relevant literature is reviewed and reasons are suggested for reported contradictory experimental results. A list is included of hypotheses of the factors affecting the rate of crack propagation in a biaxial stress field suggested in the literature which require experimental verification. A.R.H.

N84-13267# Overseas Relations Branch Translation Service, London (England).

INVESTIGATION OF THE POSSIBILITIES FOR THE ELECTRODEPOSITION OF TITANIUM FROM NON-AQUEOUS SOLUTIONS

A. M. Levinskiene, L. E. Simanavichius, and V. Y. Akimov 13 Sep. 1983 16 p refs Transl. into ENGLISH from Tr. Akad. Nauk. Litovsk SSR (USSR), v. 5, series B, 1977 p 37-46

(BLL-OA-Trans-3069-(6196.3)) Avail: NTIS HC A02/MF A01

In the electrolysis of solutions of TiCl4 in dimethylsulphoxide (DMSO) and mixtures of DMSO with ethanol within the range i(k) = 1 - 10 A/ddm sq, very thin (< 0.2 micrometer) colored films of metallic appearance, which were stable in air and contained up to 20% titanium, were obtained on the cathode. The thickness of the films depends very little on i(k) and the length of time of the electrolysis. It is proposed that the formation of the colored cathodic films is a secondary, chemical process. It was determined that titanium is not deposited from solutions of TiCl4 in methanol and mixtures of it with DMSO or aromatic hydrocarbons; in amides; simple and complex esters; acetonitrile; nitromethane; acetyl chloride and thioonyl chloride; propylene carbonate; hexamethylphosphoramide; nor from solutions of TiCl3 in DMSO, amides, hexamethylphosphoramide and mixtures of DMSO with ethanol. Author

N84-13268# Overseas Relations Branch Translation Service, London (England).

CURRENT STATE OF TITANIUM COATING METHODS

M. Nemoto 13 Sep. 1983 8 p refs Transl. into ENGLISH from Kinzoku (Japan), v. 45, no. 8, 1975 p 22-23

(BLL-OA-Trans-3067-(6196.3)) Avail: NTIS HC A02/MF A01

Coating with titanium is carried out as a means of utilizing its excellent anticorrosion properties and is used for a wide range of industrial application. The high cost of titanium is reduced by coating it to cheaper materials. Various coating methods were proposed, however, the methods are beset with problems. At present, there are no fully satisfactory methods for performing titanium coatings, but provided certain controls are exercised and under suitable conditions, the process is valuable. Of course, application of a coating of pure titanium would be idea for a broad range of applications, therefore, further studies will need to be conducted. B.G.

N84-13269# American Univ., Washington, D. C. Dept. of Chemistry.

THE LOCALIZED CORROSION OF ALUMINUM ALLOYS: A REVIEW Technical Progress Report

R. T. Foley Jul. 1983 62 p Presented at Conf. on the Control and Exploitation of the Corrosion of Aluminum Alloys, Cranfield, England, 5-8 Apr. 1983

(Contract N00014-75-C-0799; NR Proj. 036-106)
(AD-A132582; TR-18) Avail: NTIS HC A04/MF A01 CSCL 11/6

This paper was presented as a keynote address at a conference on the Control and Exploitation of the Corrosion of Aluminum Alloys held at Cranfield, Bedfordshire, England, on April 5-8, 1983. The review was organized by a consideration of the four steps involved in localized corrosion: (1) adsorption of the reactive anion on the oxide covered aluminum; (2) chemical reaction of the adsorbed anion with the aluminum ion in the aluminum oxide lattice on the precipitated aluminum hydroxide; (3) thinning of the oxide film by dissolution; and (4) the direct attack of the exposed metal by the anion, perhaps, assisted by an anodic potential. The experimental work reported in the literature is evaluated within this framework. GRA

N84-13270# Naval Postgraduate School, Monterey, Calif.
CHARACTERIZATION OF THE STRUCTURE AND SUBSTRUCTURE OF THERMALLY TRANSFORMATION CYCLED CU-ZN-AL SHAPE MEMORY ALLOYS M.S. Thesis
Paul W. Bobowiec Jun. 1983 58 p
(AD-A132341) Avail: NTIS HC A04/MF A01 CSCL 11/6

Samples of a Cu-Zn-Al shape memory alloy were thermally cycled up to 100 times, using a differential scanning calorimeter, between the parent and martensite phases. The trends of transformation temperature versus number of cycles were correlated with observed microstructure. Specimens were examined through transmission electron microscopy techniques. The character of lattice defects and residual structures in the parent phase provided an understanding of substructural conditions enhancing martensite formation and reversion. Author (GRA)

N84-13271# Naval Postgraduate School, Monterey, Calif.
THERMOMECHANICAL PROCESSING OF M-50 STEEL M.S. Thesis
Keith Robert Larson, Jr. Jun. 1983 48 p
(AD-A132272) Avail: NTIS HC A03/MF A01 CSCL 11/6

Thermomechanical processing of AISI M-50 bearing steel was accompliished by an initial austenitize, and quench followed by reheating and warm-rolling to a true strain of 2.0. Warm-rolling was successfully conducted at 650, 700, or 750 deg C. The effect of austenitizing temperature on grain size and residual carbides was evaluated following austenitizing at temperatures from 1090 to 1250 deg C. Grain growth was noted with increasing austenitizing temperature, especially for temperatures above 115 deg C. Evaluation of the effect of warm-rolling on both carbide refinement and composition was performed using scanning electron microscopy. Comparison of as-received M-50 and the warm-rolled product were made. Temper carbides, those precipitated during the warm-rolling process, are refined by the processing. Residual carbides, those not dissolved in the initial austenitizing treatment, were only slightly refined in the rolling process. Stress-strain testing was conducted on both as-received and warm rolled materials and the increased strength observed were correlated with refined carbide and grain structures resulting from the warm-rolling. Author (GRA)

N84-13272# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
EVALUATION OF STRESS CORROSION CRACKING CHARACTERISTICS OF SELECTED FASTENER SYSTEMS IN 7075-T6 ALUMINUM Final Report, Nov. 1981 - Nov. 1982
Neal R. Ontko Jun. 1983 40 p
(AF Proj. 2418)
(AD-A132162; AD-E850405; AFWAL-TR-83-4028) Avail: NTIS HC A03/MF A01 CSCL 11/6

This effort evaluated the stress corrosion cracking characteristics of selected fatigue rated fastener systems in 7075-T6 Aluminum extruded material. The fastener systems used were installed with equivalent amounts of interference in the test blocks and subjected to 1700 hours of alternate immersion exposure in 3.5 % salt water. Author (GRA)

N84-13273# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
TENSILE AND LOW-CYCLE FATIGUE MEASUREMENTS ON CROSS-ROLLED TUNGSTEN AT 1505 K
R. E. Schmunk, G. E. Korth, and M. Ulrickson (Princeton Univ.) 1983 5 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract DE-AC07-76ID-01570)
(DE84-000805; EGG-M-18083; CONF-830942-31) Avail: NTIS HC A02/MF A01

Tungsten continues to be considered for use in fusion reactors because of its mechanical properties, good thermal shock resistance, and relatively high thermal conductivity. Low-cycle fatigue and tensile tests were made at 1505 K on specimens fabricated from 12.7-mm thick cross-rolled tungsten plate which was prepared by a powder metallurgy process. All tests were made in vacuum, and the fatigue tests were made in strain control. The experimental fatigue data agree fairly well with the universal slopes equation, giving a slightly lower number of cycles to fail than predicted by the equation for a given strain range. Details of the test procedure are reported along with the experimental results. These data should support continued design work where tungsten is considered for application in pulsed reactor systems. DOE

N84-13274# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
CALCULATIONS OF COMPOSITION BOUNDARIES OF SATURATED PHASES
Leo Brewer and Susie Hahn 27 Sep. 1983 10 p refs
(Contract DE-AC03-76SF-00098)
(DE84-001665; LBL-16726) Avail: NTIS HC A02/MF A01

The equilibrium composition boundaries of pairs of saturating solids, liquids, or a combination of a solid and liquid are calculated for the use of the HP-41CV calculator. The activity coefficients must be represented in the form ln (BETA) 1 = (b/sub h//T - b/sub s/)x2(2) + (c/sub h//T - c/sub x/)x2(3) where h refers to an enthalpy contribution and s refers to an excess entropy contribution. For solid-liquid equilibria, enthalpies and entropies of fusion are required. For all equilibria, provision is made for use of hypothetical standard states such as the Henry's Law standard states. For example, in treating solid solutions of molybdenum in face-centered cubic metals such as Ni, Rh, or Pt, it is sometimes convenient to use a hypothetical fcc standard state of Mo which represents the limiting Henry's Law behavior of Mo in the fcc metal and has much different properties than a real fcc molybdenum solid. DOE

N84-13275# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
EFFECT OF PHOSPHORUS ON THE SWELLING AND PRECIPITATION BEHAVIOR OF AUSTENITIC STAINLESS STEELS DURING IRRADIATION
E. H. Lee, L. K. Mansur, and A. F. Rowcliffe 1983 8 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract W-7405-eng-26)
(DE84-000412; CONF-830942-19) Avail: NTIS HC A02/MF A01

It has been observed that increasing the volume fraction of the needle shaped iron phosphide phase in austenitic stainless steels tends to inhibit void swelling during neutron irradiation. An earlier analysis showed that this effect could not be accounted for in terms of enhanced point defect recombination at particle matrix interfaces. The behavior of the iron phosphide phase has been further examined using dual ion beams irradiations. It was found that the particle matrix interface serves as a site for the nucleation of a very fine dispersion of helium bubbles. It is thought that since a high number density of cavities lowers the number of helium atoms per cavity, the irradiation time for the cavities to accumulate the critical number of gas atoms for bias driven growth is correspondingly increased. Although the phosphide phase nucleates rapidly, it eventually undergoes dissolution if either the G or Laves phase develops with increasing dose. DOE

N84-13276# Massachusetts Inst. of Tech., Cambridge. Nuclear Reactor Lab.

STRUCTURES AND PROPERTIES OF RAPIDLY SOLIDIFIED 9Cr-1Mo STEEL

J. Megusar, E. Lavernia, P. Domalavage, O. K. Harling, and N. J. Grant 1983 6 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Materials, Albuquerque, N. Mex., 19 Sep. 1983

(Contract DE-AC02-78ER-10107)

(DE84-001276; DOE/ER-10107/21; CONF-830942-49) Avail: NTIS HC A02/MF A01

Irradiation-induced shifts of the ductile to brittle transition temperature and possible hydrogen embrittlement of ferritic steels are currently considered major problems for controlled thermonuclear reaction applications. Rapid solidification and in particular liquid dynamic compaction (LDC) were studied in developing 9Cr-1Mo steel as a candidate first wall material. Structural refinements such as reduction of segregate, fine grain size and fine size of second phase particles are retained in this process and this will have a favorable effect on fracture properties. LDC has also the potential of preparing first wall components directly from the melt and this would have an economic advantage over conventional ingot technology. DOE

N84-13277# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

COMPARISON OF COMPRESSION PROPERTIES AND SWELLING OF BERYLLIUM IRRADIATED AT VARIOUS TEMPERATURES

J. M. Beeston, L. G. Miller, E. L. Wood, Jr. (Argonne National Lab., Ill.), and R. W. Moir (California Univ., Lawrence Livermore Lab.) 1983 16 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983

(Contract W-31-109-eng-38)

(DE84-000597; CONF-830942-9) Avail: NTIS HC A02/MF A01

A beryllium cylinder irradiated in Experimental Breeder Reactor (EBR-II) for four years at 700 to 760 K to a neutron fluence of 6.13 x 10(22) n/cm(2) (total) or 1 x 10(22) n/cm(2) (E > 1 MeV) was cut into samples and tested. Yield strength and plastic strain was determined in compression tests at 300, 723, 823 K and after annealing at 1173 K for one hour. The immersion density and helium content were measured on samples. An equation for swelling was derived from the data by regression analysis. The microstructure showed agglomeration of helium in voids or bubbles at the grain boundaries. DOE

N84-13278# Oak Ridge National Lab., Tenn.

EFFECT OF IMPLANTED HELIUM ON THE MICROSTRUCTURE AND CREEP PROPERTIES OF ORDERED (FeO.49 NIO.51) V-3 ALLOYS

P. S. Sklad and H. Schroeder (Kernforschungsanlage, Juelich, West Germany) 1983 6 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983

(Contract W-7405-eng-26)

(DE84-000691; CONF-830941-34) Avail: NTIS HC A02/MF A01

A series of long-range ordered alloys with base composition (FeO 4(??)NiO 51) 3V were homogeneously injected with approx. 100 appm helium at 6000 C using cyclotron. Post-implantation creep testing at 6000 C revealed that the time to rupture as well as the total creep strain was reduced drastically compared to unimplanted material. Transmission electron microscopy revealed that while the material retained its long range order after implantation, the microstructure in the as-implanted material was characterized by a high density of faulted interstitial dislocation loops as well as a high density of cavities 2.5 to 5.0 nm in diameter. Most of the cavities were peferentially located on the faulted loops or on grain boundaries. The high angle grain boundaries also contained a large number of small vanadium carbide precipitates. It was observed that cavities on grain boundaries were smaller when associated with these precipitates. In addition a number of larger, 7 to 10 nm diameter, faceted cavities were found to be associated with antiphase domain boundaries in the ordered microstructure. DOE

N84-13279# California Univ., Livermore. Lawrence Livermore Lab.

REDUCTION OF TRITIUM PERMEATION THROUGH IRON USING ALUMINUM-ION IMPLANTATION

R. G. Musket, S. A. Steward, D. W. Brown, and F. S. Uribe Nov. 1983 6 p refs Presented at the Am. Vacuum Soc. Meeting, Boston, 1 Nov. 1983

(Contract W-7405-eng-48)

(DE84-000184; UCRL-89325; CONF-831171-4) Avail: NTIS HC A02/MF A01

Although ion implantation was shown to be an excellent technique for modifying many surface properties of metallurgical materials, the first data on its use to reduce the permeation of a gas through a material is contained. In particular, the initial results of a study using aluminum ion implantation combined with a post-implant treatment for creation of a barrier to tritium permeation through polycrystalline iron is summarized. DOE

N84-13280# Oak Ridge Y-12 Plant, Tenn. Metals and Ceramics Dept.

DILATOMETRIC INVESTIGATION OF PHASE-TRANSFORMATION KINETICS IN HP 9-4-20 STEEL

R. A. Vandermeer 11 Oct. 1983 29 p refs

(Contract W-7405-eng-26)

(DE84-001180; Y/DV-315) Avail: NTIS HC A03/MF A01

Dilatometry was used to investigate the phase transformation behavior of HP 9-4-20 steel. The decomposition of austenite to either martensite or bainite was monitored during continuous cooling or isothermal holds. The martensite start temperature, M/sub s/, was found to be 290 + or - 30C for cooling rates between 0.010C/s and 200C/s. Isothermal decomposition of austenite to bainite occurred both above and below M/sub s/ and was accelerated if some athermal martensite was formed first. The previously published TTT (time-temperature-transformation) diagram for HP 9-4-20 steel was modified to include the sub M/sub s/ formation of bainite. To avoid the formation of bainite during cooling through its formation range of 3240C to 2240C, a critical cooling rate of 0.050C/s must be exceeded. Partial time-dependence reversion of martensite to austenite took place during tempering at temperatures as low as 6000C. The extent and kinetics of reversion increased with increases in tempering temperature above 6000C. The linear coefficients of thermal expansion of austenite, bainite, and martensite in HP 9-4-20 steel were determined. DOE

N84-13281# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science.

IRRADIATION RESPONSE IN TITANIUM-MODIFIED AUSTENITIC STAINLESS STEELS PREPARED BY RAPID-SOLIDIFICATION PROCESSING. PART 3. A MODEL FOR THE EFFECT OF TITANIUM ADDITION

D. Imeson, C. H. Tong, C. A. Parker, J. B. VanderSande, N. J. Grant, and O. K. Harling 1983 5 p refs Presented at the 3rd Top. Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983

(Contract DE-AC02-78ER-10107)

(DE84-001296; DOE/ER-10107/19; CONF-830942-42) Avail: NTIS HC A02/MF A01

Titanium carbide precipitation on dislocations during irradiation and recoil-induced particle dissolution are considered. The outline analysis given indicates that complete swelling suppression may occur in favorable conditions due to a counterbalancing of the effective dislocation interstitial bias. The behavior is, however, not stable against a return to normal swelling levels for type 316 steels. The model presented is able to account for the diverse experimentally observed irradiation response. DOE

N84-13282# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science.

IRRADIATION RESPONSE IN TITANIUM-MODIFIED AUSTENITIC STAINLESS STEELS PREPARED BY RAPID-SOLIDIFICATION PROCESSING. PART 2. DUAL-ION IRRADIATIONS

C. H. Tong, D. Imeson, J. B. VanderSande, N. J. Grant, O. K.

Harling, and J. Megusar 1983 5 p ref Presented at the 3rd Top. Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract DE-AC02-78ER-10107)
(DE84-001297; DOE/ER-10107/18; CONF-830942-44) Avail: NTIS HC A02/MF A01

Dual-ion irradiations have been performed on Path A PCA and other alloys with increased titanium and carbon content, prepared by rapid-solidification processing. Comparison with the neutron response shows many points of similarity. The effect of the amount of Ti and C included, and its initial distribution, is investigated, as is the difference between fully processed material, including consolidation by hot-extrusion, and the as-rapidly-solidified alloy. It is shown that increased TiC content can be effective in controlling swelling both directly, and by increasing the microstructural stability. DOE

N84-13283# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science.
IRRADIATION RESPONSE IN TITANIUM-MODIFIED AUSTENITIC STAINLESS STEELS PREPARED BY RAPID-SOLIDIFICATION PROCESSING. PART 1: MICROSTRUCTURAL RESPONSE TO NEUTRON IRRADIATION
D. Imeson, M. Lee, J. B. VanderSande, N. J. Grant, and O. K. Harling 1983 5 p refs Presented at the 3rd Top. Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract DE-AC02-78ER-10107)
(DE84-001298; DOE/ER-10107/17; CONF-830942-43) Avail: NTIS HC A02/MF A01

The neutron irradiation response of cold worked Path A PCA has been investigated to about 34 dpa (3100 appm He). Cavity formation can be limited solely to helium accommodation in bubbles under certain circumstances, that is, with bias driven swelling completely suppressed. Under other conditions, however, similar behavior to that of type 316 steel is observed. The differences are strongly correlated with differences in the initial distribution of titanium carbide particles and their precipitation and/or recoil induced dissolution under irradiation. The effects of rapid solidification processing are explored. DOE

N84-13284# Oak Ridge National Lab., Tenn. Mathematics and Statistics Research Div.
MODELING BINARY-ALLOY SOLIDIFICATION PROCESSES: NUMERICAL IMPLEMENTATION
A. D. Solomon, V. Alexiades, and D. G. Wilson Oct. 1983 35 p refs
(Contract W-7405-eng-26)
(DE84-001587; ORNL/CSD-122) Avail: NTIS HC A03/MF A01

The numerical implementation of a mathematical model of a binary alloy solidification process is described. The model takes into account the mushy zone of dendritic growth between liquid- and solid-phase regions. DOE

N84-13285# Oak Ridge National Lab., Tenn. Materials and Ceramics Div.
MICROSTRUCTURE OF 9 Cr-1 MoVNb STEEL IRRADIATED TO 40 dpa AT ELEVATED TEMPERATURES IN HFIR
J. M. Vitek and R. L. Klueh 1983 7 p refs Presented at 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract W-7405-eng-26)
(DE84-000339; CONF-830942-28) Avail: NTIS HC A02/MF A01

As part of an effort to evaluate the irradiation behavior of ferritic steels, a 9 CR-1 MoVNb alloy was irradiated in a high flux isotope reactor (HFIR) to a dose of approx. 36 dpa at temperatures of 300, 400, 500, and 6000 C. In addition to the displacement damage produced during irradiation, a transmutation reaction of nickel during HFIR irradiation resulted in the simultaneous production of approx. 30 at. ppM He. Electron microscopy disks in the normalized and tempered condition were irradiated, and the microstructures were evaluated as a function of irradiation temperature. A few small cavities were observed after irradiation at 300, 500, and 6000 C. However, a pronounced cavity microstructure was found after irradiation at 4000 C. At this temperature, the cavities had a volume-averaged diameter of 15 nm and a concentration of 1.1 x 10(21) m(+3), resulting in a void-swelling contribution of 0.19%. The cavities at 4000 C were homogeneously distributed throughout the tempered martensite matrix, and showed no preference for lath boundaries or precipitate interfaces. The results are compared to those recently reported on a similarly irradiated 12 Cr-1 MoVW ferritic steel. DOE

N84-13286# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
ELECTROCHEMICAL ETCHING OF TITANIUM-ALLOY CASTINGS
J. C. Griess, S. A. David, R. J. Gray, and C. W. Houck Oct. 1983 37 p refs
(Contract W-7405-eng-26)
(DE84-000244; ORNL/TM-8830) Avail: NTIS HC A03/MF A01

This study was conducted to determine whether a potentiostatic electrochemical method could be used to etch selectively either the dendrites or the interdendritic material from Ti cast structures and thereby reveal their microstructures. Cast binary titanium alloys containing Mo, Ta, Nb, Al, and Cr and one multicomponent alloy containing Al, Ta, Nb, and Mo were polarized in sulfuric, oxalic, and fluosilicic acids and in a potassium hydroxide solution. Potentiostatic anodic polarization curves were obtained for each alloy. Results showed that the electrode potential for passivation was nearly the same for all alloys in a given acid, although the current density at the passivation potential varied from alloy to alloy. Generally for most alloying elements, the current density at the passivation potential decreased as the concentration of the alloying element increased, but not linearly. In the alkaline solution only the Ti-15% Cr alloy underwent significant dissolution, which occurred in the transpassive potential region We were able to develop the dendritic structure with only the Ti-15% Mo, Ti-15% Ta, and Ti-15% Cr alloys. Possible reasons for the inability to delineate the dendritic structure in other alloys are discussed. DOE

N84-13287# California Univ., Livermore. Lawrence Livermore Lab.
ALUMINUM AS A GLOBAL HIGH-PRESSURE EQUATION-OF-STATE STANDARD
W. J. Nellis, A. C. Mitchell, N. C. Holmes, and R. J. Trainor Aug. 1983 5 p refs Presented at the 9th Intern. Assoc. for the Advan. of High Pressure Sci. and Technol. Conf., Albany, 25 Jul. 1983
(Contract W-7405-eng-48)
(DE84-000153; UCRL-89712; CONF-830768-2) Avail: NTIS HC A02/MF A01

Equation-of-state (EOS) standard materials are required for all static and dynamic high-pressure experiments. It is proposed that Al is an excellent candidate as an EOS standard, because of its simple s-p electronic structure. It can be both double-shocked and isentropically released to reach states off the Hugoniot. Its shock impedance is closely matched to that of LiF, a high-pressure window material. Double-shock experiments on Al gave agreement between effective Grueneisen parameters and constant (BETA)/V scaling at lower pressures. A shock impedance match was performed with Mo and Al in close proximity to an underground nuclear explosion. DOE

N84-13288# Oak Ridge National Lab., Tenn.
OXIDATION OF INCONEL ALLOY MA754 AT LOW OXIDATION POTENTIAL
D. N. Braski, P. D. Goodell, J. V. Cathcart, and R. H. Kane 1983 3 p Presented at the Electron Soc. of Am. Ann. Meeting, Phoenix, Ariz., 6 Aug. 1983 Prepared in cooperation with International Nickel Co., Suffern, N.Y.
(Contract W-7405-eng-26)
(DE83-017191; CONF-830871-4) Avail: NTIS HC A02/MF A01

It has been known for some time that the addition of small oxide particles to an 80 Ni-20 Cr alloy not only increases its elevated-temperature strength, but also markedly improves its

resistance to oxidation. The mechanism by which the oxide dispersoid enhances the oxidation resistance is being studied. Small disks (3 mm diam x 0.38 mm thick) were cut from Inconel MA754 plate stock and prepared with two different surface conditions. Disks having both surface treatments were oxidized in a radiantly heated furnace for 30 s at 10000C. Three different environments were investigated: hydrogen with nominal dew points of 00C, -250C, and -550C. The oxide particles and films were examined by using extraction replicas (carbon) and by back-polishing to the oxide/metal interface. The particles were analyzed by EDS and selected area diffraction. DOE

N84-13289# Pacific Northwest Lab., Richland, Wash.
GRAIN BOUNDARY SEGREGATION AND ENVIRONMENTAL DEGRADATION OF A FERRITIC STAINLESS STEEL
R. H. Jones and M. T. Thomas Aug. 1983 7 p refs Presented at the Intern. Symp. on Environ. Degradation of Mater. in Nucl. Power Systems - Water Reactors, Myrtle Beach, S.C., 22-24 Aug. 1983
(Contract DE-AC06-76RL-01830)
(DE83-016927; PNL-SA-11138; CONF-830845-3) Avail: NTIS HC A02/MF A01

Grain boundary segregation analysis, hydrogen embrittlement and stress corrosion tests were conducted on a 13 mm thick plate of the Fusion AOD heat (No. 9607) of HT-9. Grain boundary chemical analysis was performed using Auger Electron Spectrometers. The Model 595 spectrometer has a spatial resolution of less than 0.1 (SIGMA)m which allows segregation to be measured on very small segments of grain boundary or other microstructural features. Analysis was performed on material given the following heat treatments: (1) 10400 C for 30 min. air cooled +7600 C for 2-1/2 hr. air cooled; (2) same as 1 + 240 hr. at 5000 C. DOE

N84-13290# Sandia Labs., Albuquerque, N. Mex. Process Development Lab.
FLUIDIZED-BED AND SALT-BATH HEAT TREATING (AISI 4130 AND 4340 ALLOY STEELS)
Wayne L. Cyrus Aug. 1983 14 p refs
(Contract DE-AC04-76DP-00789)
(DE84-000979; SAND-82-2498) Avail: NTIS HC A02/MF A01

Using commercial alloy steels AISI 4130 and AISI 4340, a series of heat-treating, parametric studies were performed on specimens in both an electric fluidized-bed furnace and an electric neutral salt-bath furnace. An evaluation of heat-treating methods was performed by comparing tensile test data for the two alloy steels. Surface characterization of test specimens was performed using Auger analyses to discern effects, if any, caused by the heat-treatment method. Certain test results for two significantly different heat-treating methods are given. Environmental and safety aspects of salt-bath and fluidized-bed heat treating are discussed. DOE

N84-13291# Pacific Northwest Lab., Richland, Wash.
MODELING CRACK-GROWTH PROCESSES IN FUSION-REACTOR MATERIALS
Russell H. Jones and Wilhelm G. Wolfer (Wisconsin Univ., Madison) Sep. 1983 14 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract DE-AC06-76RL-01830)
(DE84-000477; PNL-SA-11425; CONF-830942-12) Avail: NTIS HC A02/MF A01

Models for the effect of the chemical environment on crack-growth processes in austenitic and ferritic stainless were evaluated. The effect of impurity segregation, yield strength, and hydrogen on crack growth of HT-9 and radiation-induced phosphorus segregation on the intergranular stress corrosion of 316SS were evaluated. Moderate increases in impurity segregation and/or yield strength caused significant decreases in the K sub IC and K sub TH of HT-9, while less than a 10 fold increase in the integranular stress-corrosion crack-growth rate of 316SS was predicted for a fluence of 100 dpa using the radiation-induced phosphorus segregation data of Brimhall et al. and the stress-corrosion model of Parkins. Therefore, while radiation-induced impurity segregation is greater in 316SS than HT-9, the effect of impurity segregation may be more pronounced in HT-9. DOE

N84-13292# Argonne National Lab., Ill. Materials Science and Technology Div.
CORROSION OF FERROUS ALLOYS IN EUTECTIC LEAD-LITHIUM ENVIRONMENTS
O. K. Chopra and D. L. Smith Sep. 1983 7 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract W-31-109-eng-38)
(DE84-000593; CONF-830942-7) Avail: NTIS HC A02/MF A01

Corrosion data was obtained on austenitic prime candidate alloy (PCA) and Type 316 stainless steel and ferritic HT-9 and Fe-9Cr-1Mo steels in a flowing Pb-17 at. % Li environment at 727 and 700 K (454 and 4270 C). The results indicate that the dissolution rates for both austenitic and ferritic steels in Pb-17 Li are an order of magnitude greater than in flowing lithium. The influence of time, temperature, and alloy composition on the corrosion behavior in Pb-17 Li is similar to that in lithium. The weight losses for the austenitic steels are an order of magnitude greater than for the ferritic steels. The rate of weight loss for the ferritic steels is constant, whereas the dissolution rates for the austenitic steels decrease with time. After exposure to Pb-17 Li, the austenitic steels develop a very weak and porous ferrite layer which easily spalls from the specimen surface. DOE

N84-13293# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
MASS TRANSFER BEHAVIOR OF A MODIFIED AUSTENITIC STAINLESS STEEL IN LITHIUM
P. F. Tortorelli and J. H. DeVan 1983 7 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract W-7405-eng-26)
(DE84-000338; CONF-830942-29) Avail: NTIS HC A02/MF A01

An austenitic stainless steel that was developed to resist neutron damage was exposed to lithium in the high temperature part of a thermal convection loop for 6700 h. Specimens of this Prime Candidate Alloy (PCA) composed of 65.0 Fe-15.9 Ni-13.0 Cr-1.9 Mo-1.9 Mn-1.7 Si-0.5 Ti-0.05 C (wt %) were exposed at 600 and 5700C in both solution annealed and cold worked forms. The dissolution process was found to be similar to other austenitic alloys in flowing lithium: weight losses of PCA eventually became linearly proportional to exposure time with the specimen surfaces exhibiting porous layers depleted in nickel and chromium. However, the measured weight losses and dissolution rates of these PCA specimens were higher than those of type 316 stainless steel exposed under similar conditions and can be attributed to the higher nickel concentration of the former alloy. The effect of cold work on dissolution rates was less definitive, particularly at 5700C. At longer exposure times, the annealed PCA specimen exposed at 6000C suffered greater dissolution than the cold worked material, while no effect of prior deformation was observed by analysis of the respective surfaces. DOE

N84-13294# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
A COMPARISON OF THE IRRADIATED TENSILE PROPERTIES OF A HIGH-MANGANESE AUSTENITIC STEEL AND TYPE 316 STAINLESS STEEL
R. L. Klueh and M. L. Grossbeck 1983 6 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract W-7405-eng-26)
(DE84-000260; CONF-830942-33) Avail: NTIS HC A02/MF A01

The USSR steel EP-838 is a high manganese (13.5%), low nickel (4.2%) steel that also has lower chromium and molybdenum than type 316 stainless steel. Tensile specimens of 20% cold worked EP-838 and type 316 stainless steel were irradiated in the High Flux Isotope Reactor (HFIR) at the coolant temperature (approx. 500C). A displacement damage level of 5.2 dpa was

reached for the EP-838 and up to 9.5 dpa for the type 316 stainless steel. Tensile tests at room temperature and 3000C on the two steels indicated that the irradiation led to increased strength and decreased ductility compared to the unirradiated steels. Although the 0.2% yield stress of the type 316 stainless steel in the unirradiated condition was greater than that for the EP-838, after irradiation there was essentially no difference between the strength or ductility of the two steels. The results indicate that the replacement of the majority of the nickel by manganese and a reduction of chromium and molybdenum in an austenitic stainless steel of composition near that for type 316 stainless steel has little effect on the irradiated and unirradiated tensile properties at low temperatures. DOE

N84-13295# Argonne National Lab., Ill. Materials Science and Technology Div.

INFLUENCE OF A FLOWING-LITHIUM ENVIRONMENT ON THE FATIGUE AND TENSILE PROPERTIES OF TYPE 316 STAINLESS STEEL

O. K. Chopra and D. L. Smith Sep. 1983 7 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983

(Contract W-31-109-eng-38)

(DE84-000611; CONF-830942-15) Avail: NTIS HC A02/MF A01

Low cycle fatigue and tensile data was obtained on type 316 stainless steel in a flowing lithium environment of controlled purity. The results show that the fatigue life of the steel in flowing lithium at 755 K is greater than in air. Preexposure of the material to lithium reduces fatigue life. The reduction in fatigue life may be attributed to the formation of a weak ferrite layer after lithium exposure. Tensile data for cold worked Type 316 stainless steel indicate that at temperatures between 476 and 755 K, a flowing lithium environment has little or no effect on the tensile properties of the steel. DOE

N84-13296# Oak Ridge National Lab., Tenn.

DIFFUSIVITIES OF HYDROGEN IN YTTRIUM AND YTTRIUM ALLOYS

P. W. Fisher and M. Tanase 1983 6 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19-22 Sep. 1983

(Contract W-7405-eng-26)

(DE84-000411; CONF-830942-16) Avail: NTIS HC A02/MF A01

Diffusivities of hydrogen in yttrium, yttrium-niobium (Y-Nb) alloy (3:7), yttrium-niobium (Y-Nb) composite (3:7), and yttrium-thorium (Y-Th) alloy (4:1) in the Sieverts region were measured by gas absorption in the temperature range from 960 to 11600K. The diffusivity of hydrogen in yttrium was found to be D = 300 exp(-160,000/RT), where R = 8.314 J.K(+1).mol(+1). Above 1000 K, diffusivities are in the following order: D(Y-Nb composite)> D(Y-Nb alloy)> D(Y-Th alloy)> D(Y), where D(Y-Nb composite) = 2.4 D(Y) and D(Y-Nb alloy) = 1.5 D(Y). Below 1000 K, effective diffusivities of the alloys become quite erratic and fall below those for yttrium. DOE

N84-13297# Sandia Labs., Albuquerque, N. Mex. Thermophysical Properties Div.

MEASUREMENT OF THERMAL CONDUCTIVITY FROM HIGH-TEMPERATURE PULSE DIFFUSIVITY AND CALORIMETRY MEASUREMENTS

E. P. Roth 1983 22 p refs Presented at the 18th Intern. Thermal Conductivity Conf., Rapid City, S. D., 3 Oct. 1983

(Contract DE-AC04-76DP-00789)

(DE84-000353; SAND-83-2134C; CONF-8310163-1) Avail: NTIS HC A02/MF A01

The measurement of the thermal conductivity of small samples over an extended temperature range is discussed. Experimental data on thermal diffusivity obtained by the laser pulse technique are combined with specific heat data, obtained either by differential scanning calorimetry or by vaporization calorimetry, to derive the thermal conductivity. As an example of the use of this technique, data are reported on the conductivity of an ASTM A517 steel over the temperature range 100 to 12000C. The thermal diffusivity was derived from measured temperature vs time data obtained from a laser pulse diffusivity system. A data reduction technique was used which simultaneously corrects for finite pulse time effects and sample heat losses by radiation. The specific heat was measured directly at temperatures below 6800C using a commercial differential scanning calorimeter. For temperatures up to 12000C, the specific heat was determined by differentiating a curve fit to the measured sample enthalpy. The effect of a classical Curie transition during the measurements of both the diffusivity and enthalpy is discussed. DOE

N84-13298# Connecticut Univ., Storrs.

DENSITY OF OCCUPIED D STATES IN TRANSITION METAL-METALLOID METALLIC GLASSES

D. M. Pease, G. H. Hayes, M. Choi, J. I. Budnick, W. A. Hines, R. Hasegawa (Allied Corp., Morristown, N.J.), and S. M. Heald (Brookhaven National Lab.) 1983 6 p refs Presented at the 5th Intern. Conf. on Liquid and Amorphous Metals, Los Angeles, 15 Aug. 1983

(Contract DE-AC02-76CH-00016; Grant AF-AFOSR-0030-80)

(DE84-001206; BNL-33604; CONF-830888-9) Avail: NTIS HC A02/MF A01

New data on the X ray absorption edge near-in structure of the NiO 50Pt0 50) 75P25 system is compared with previous results on random solid solution alloys and other TM-M metallic glasses. Whereas experimental probes of the density of d states at the Fermi energy, rho/sub d/(E/sub f/), often indicate a sharp reduction in rho/sub d/(E/sub f/) due to the presence of metalloids or nontransition metals, absorption edge results usually indicate a negligible decrease in the total number of d holes per transition metal atom. In the (Ni0 50Pt0 50)75P25 system the number of 5d holes per Pt site is actually found to be greater than for the case of pure Pt. A model is proposed which may reconcile the results of absorption edge measurements and rho/sub d/(E/sub f/) determinations. DOE

N84-13299# Connecticut Univ., Storrs. Dept. of Physics.

EXAFS STUDY OF METGLAS 2605 CO

Guy H. Hayes, Joseph I. Budnick, Myung H. Choi, William A. Hines, Douglas M. Pease, Dale E. Sayers (North Carolina State Univ., Raleigh), and Steve M. Heald (Brookhaven National Lab.) 1983 6 p refs Presented at the 5th Intern. Conf. on Liquid and Amorphous Metals, Los Angeles, 15 Aug. 1983

(Contract DE-AC02-76CH-00016; Grant AF-AFOSR-0030-80)

(DE84-001203; BNL-33605; CONF-830888-10) Avail: NTIS HC A02/MF A01

The environment of the Fe and Co sites in Metglas 2605 CO (Fe67Co18B14Si1) were investigated by the EXAFS technique. Studies were conducted on alloys subjected to a magnetic anneal, as well as alloys in the as fabricated condition. The EXAFS measurements were carried out with the X ray polarization directions parallel and perpendicular to the ribbon direction. The average distance from a Co site to the first transition metal coordination shell is always less than the corresponding distance for an Fe site. In addition, upon comparing data taken at room temperature with that collected at nitrogen temperature, an anisotropic behavior is detected in the fractional change in disorder. DOE

N84-13300# Brookhaven National Lab., Upton, N. Y.

CHARACTERIZATION OF ALLOY 600 SURFACES AFTER EXPOSURE TO A CAUSTIC ENVIRONMENT

H. S. Isaacs, H. W. Kraner, and A. L. Hanson 1983 15 p refs Presented at Environ. Degradation of Mater. in Nucl. Power Systems-Water Reactors, Myrtle Beach, S.C., 22 Aug. 1983 Sponsored in part by EPRI

(Contract DE-AC02-76CH-00016)

(DE83-018297; BNL-33666; CONF-830845-4) Avail: NTIS HC A02/MF A01

The surface morphology and compositions of as-received and electropolished Alloy 600 surfaces were studied using scanning electron microscopy and (4)He() Rutherford Backscattering. The samples were exposed to 1% NaOH with 1% Na2CO3 solutions

over a range of potentials. The as-received surfaces did not show any distinctive changes whereas the electropolished surfaces were markedly dependent on the underlying metal. Between -90 and 70 mV, relative to a nickel/hydrogen electrode, the active surface showed a distinct grain boundary and grain orientation dependent etching. These surfaces were also covered by a nickel layer which decreased in thickness with potential from 100 nm at -90 mV and was not observable at 70 mV. At 170 and 225 mV a highly stressed oxide was observed which spalled off entire grains. These surfaces would be expected to show a dependence on temperature cycling. At higher potentials at and above 270 mV duplex surface oxides with high nickel outer layers and high chromium inner layers were observed. DOE

N84-13301# California Univ., Santa Barbara. Dept. of Chemical and Nuclear Engineering.
ANALYSIS OF HYDROGEN ATTACK ON PRESSURE-VESSEL STEELS Final Report
G. R. Odette 1982 49 p refs
(Contract DE-AS05-78ET-10747)
(DE84-00061; DOE/ET-10747/T1) Avail: NTIS HC A03/MF A01

The existing data on hydrogen attack in 2 1/4 Cr-1 Mo alloys is reviewed and a model of methane-pressure-induced cavity nucleation and growth kinetics presented. The model is based on creep-constrained growth of cavities, nucleated on preexisting sites driven by methane at a pressure controlled by the least stable carbide species present. A qualitative explanation of most experimental observations is provided by describing the interplay between several kinetic and thermodynamic processes as governed by various metallurgical features, e.g., carbides, grain boundary microstructure and creep strength. The model predicts the temperature and pressure dependence of hydrogen-attack-induced swelling data. These data are used to calibrate the model for several alloy conditions. The quantitative models are used to evaluate the potential infuence of critical variables, including applied stress. Given proper metallurgical practice, 2 1/4 Cr-1 Mo alloys can be safely used for liquefaction pressure vessels. However, there are substantial areas of uncertainty in this assessment; and the required metallurgical practice may involve substantial penalties. DOE

N84-13302# Pacific Northwest Lab., Richland, Wash.
RADIATION-INDUCED PHOSPHORUS SEGREGATION IN AUSTENITIC AND FERRITIC ALLOYS
J. L. Brimhall, D. R. Baer, and R. H. Jones Sep. 1983 6 p refs Presented at the 3rd Top. Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract DE-AC06-76RL-01830)
(DE84-000903; PNL-SA-11321; CONF-830942-53) Avail: NTIS HC A02/MF A01

The radiation induced surface segregation (RIS) of phosphorus in stainless steel attained a maximum at a dose of 0.8 dpa then decreased continually with dose. This decrease in the surface segregation of phosphorus at high dose levels has been attributed to removal of the phosphorus layer by ion sputtering. Phosphorus is not replenished since essentially all of the phosphorus within the irradiation zone has been segregated to the surface. Sputter removal can explain the previously reported absence of phosphorus segregation in ferritic alloys irradiated at high doses (> 1 dpa) since irradiation of ferritic alloys to low doses has shown measurable RIS. This sputtering phenomenon places an inherent limitation to the heavy ion irradiation technique for the study of surface segregation of impurity elements. The magnitude of the segregation in ferritics is still much less than in stainless steel which can be related to the low damage accumulation in these alloys. DOE

N84-13303# Pacific Northwest Lab., Richland, Wash.
DISLOCATION/OBSTACLE INTERACTIONS DURING LOW-DOSE IRRADIATION CREEP OF NICKEL
C. H. Henager, E. R. Bradley, E. P. Simonen, and R. G. Stang (Washington Univ.) Sep. 1983 6 p refs Presented at the 3rd Top. Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19-23 Sep. 1983
(Contract DE-AC06-76RL-01830)
(DE84-001416; PNL-SA-11365; CONF-830942-52) Avail: NTIS HC A02/MF A01

Analyses of interactions between gliding dislocations and irradiation induced obstacles indicated that loop unfaulting, loop annihilation, and loop sweeping can control low dose irradiation creep in fcc metals. Dislocation reactions remove glide barriers from active slip planes and rationalize rapid creep rates observed in deuteron irradiated nickel. Irradiation creep experiments revealed that preirradiation reduced irradiation creep rates in cold worked Ni. Dislocation/obstacle interactions and the role of the applied stress in barrier removal processes were related to observed irradiation creep responses. DOE

N84-13304# Pacific Northwest Lab., Richland, Wash.
PULSED-ION-IRRADIATED MICROSTRUCTURES IN MOLYBDENUM
J. L. Brimhall, E. P. Simonen, and L. A. Charlot Sep. 1983 6 p refs Presented at the 3rd Top. Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19-23 Sep. 1983
(Contract DE-AC06-76RL-01830)
(DE84-000679; PNL-SA-11364; CONF-830942-47) Avail: NTIS HC A02/MF A01

Pulsed irradiation of molybdenum in the temperature range from 1025 to 1225 K primarily retarded void nucleation. The reduction in nucleation rate could be attributed to a throttling effect caused by annealing out of subcritical void embryos. The more rapid development of the dislocation microstructure during pulsing also contributed to a reduction in void nucleation rate. Once nucleation was complete, microstructural development was not affected by pulsed irradiation compared to steady irradiation. Little pulsing effect on total void swelling or swelling rate was observed. A proposed increase in swelling caused by disintegration of depleted zones during pulsed annealing periods was not observed. DOE

N84-13305# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
LOW-CYCLE FATIGUE BEHAVIOR OF OXYGEN-FREE HIGH-CONDUCTIVITY COPPER AT 3000C IN HIGH VACUUM
K. C. Liu and C. M. Loring, Jr. 1983 6 p refs Presented at the 3rd Top. Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983 Prepared in cooperation with Oak Ridge Y-12 Plant, Tenn.
(Contract W-7405-eng-26)
(DE84-000725; CONF-830942-22) Avail: NTIS HC A02/MF A01

In vacuum fatigue tests were performed on commercially pure OFHC copper and 35% Au-65% Cu brazing filler metal at 3000 C. Excessive recrystallization due to exposure in the 10250 C brazing temperature cycle was detrimental to the fatigue life of the base metal; cold work was beneficial to the fatigue resistance. Triple point cracking and grain boundary sliding were the prevailing modes of fatigue failure observed in the full size specimens. However, a mixed morphology of ductile and cleavage like fracture was observed on the fracture surface of the subsize specimen in which the grain structure appeared to have undergone a change because of the presence of surface cold work. The braze has superior fatigue resistance, but to exploit the maximum strength, the brazed joint must be devoid of defects such as cavities and cracks. DOE

N84-13306# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
SEGREGATION AND DOMAIN STRUCTURE IN RAPIDLY SOLIDIFIED Ni3Al
J. A. Horton, C. C. Koch, and C. T. Liu 1983 3 p refs Presented at the Electron Microscopy Soc. of Am. Ann. Meeting, Phoenix, Ariz., 6 Aug. 1983
(Contract W-7405-eng-26)
(DE83-017188; CONF-830871-5) Avail: NTIS HC A02/MF A01

Rapid solidification processing (RSP) in conjunction with microalloying is being used to enhance the ductility of Ni3Al. Boron which strengthens grain boundaries was added for significant

improvement in ductility of NiAl. Specimens of Ni3Al (24 at. % Al) with additions of 0, 500, and 1000 wt ppM boron were splat-cooled in an arc-hammer apparatus. The specimens without boron were brittle while specimens with boron were ductile for all but the fastest quench rates. Microstructural characterization was performed with a Philips EM400T/FEG and JEM 120CX transmission electron microscopes. DOE

N84-13307# Los Alamos Scientific Lab., N. Mex.
LOW-HYSTERESIS MATERIALS FOR MAGNETIC REFRIGERATION: Gd SUB 1-x/Er SUB x/Al2
C. B. Zimm, J. A. Barclay, and W. R. Johanson (Pomona Coll.) 1983 10 p refs Presented at MMM Conf., Pittsburgh, 8 Nov. 1983 Submitted for publication
(Contract W-7405-eng-36)
(DE84-001685; LA-UR-83-2890; CONF-831187-5) Avail: NTIS HC A02/MF A01

The series of ferromagnetic intermetallics Gd(1-x)Er(x)Al2 are candidate working materials for magnetic refrigeration because of their large moment, small anisotropy, and the fact that their Curie temperatures span the range 14 K to 164 K. The magnitude of the magnetic hysteresis was measured as a function of temperature from 4 K to T(sub c) for polycrystalline samples of these materials via ac magnetic susceptibility and magnetization hysteresis loops. Virtually no hysteresis was found in GdAl2, and more surprisingly, less than 3000 A/m hysteresis in ErAl2, and 2000 0 A/m in Gd0 5Er0 5Al2. Moreover, the hysteresis in Gd0 5Er0 5Al2 was less than or equal to 100 A/m for T - T(sub c) < 20 K. DOE

N84-13308# California Univ., Berkeley. Earthquake Engineering Research Center.
COMPUTATIONAL MODELS FOR CYCLIC PLASTICITY, RATE DEPENDENCE AND CREEP IN FINITE ELEMENT ANALYSIS
Bahram Mosaddad and Graham H. Powell Nov. 1982 173 p refs
(Grant NSF CEE-81-05790)
(PB83-245829; UCB/EERC-82/26; NSF/CEE-82117) Avail: NTIS HC A08/MF A01 CSCL 11F

The major objective was to develop improved analytical capabilities for metal structures subjected to general loading conditions, especially cyclic and impact loading. Towards this goal an attempt was made to develop a reliable and efficient computational model for metal plasticity that is applicable to a wide range of stress analysis problems, including plane stress, plane strain, axisymmetric and three dimensional solids. A secondary objective was the development of an improved solution strategy for analysis of the creep response of metal structures. GRA

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N84-13309*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COBALT ION-CONTAINING EPOXIES
Diane M. Stoakley and Anne K. St.Clair Nov. 1983 15 p refs Presented at 35th Southeastern Regional Meeting of the Am. Chem. Soc., Charlotte, N.C., 9-11 Nov. 1983
(NASA-TM-85715; NAS 1.15:85715) Avail: NTIS HC A02/MF A01 CSCL 11G

Varying concentrations of an organometallic cobalt complex were added to an epoxy system currently used by the aerospace industry as a composite matrix resin. Methods for combining cobalt (III) acetylacetonate with a tetraglycidyl 4,4 prime - diaminodiphenylmethane-based epoxy were investigated. The effects of increasing cobalt ion concentration on the epoxy cure were demonstrated by epoxy gel times and differential scanning calorimetry cure exotherms. Analysis on cured cobalt-containing epoxy castings included determination of glass transition temperatures by thermoechanical analysis, thermooxidative stabilities by thermogravimetric analysis, and densities in a density gradient column. Flexural strength and stiffness were also measured on the neat resin castings. Author

N84-13310*# Hughes Research Labs., Malibu, Calif.
PLASMA POLYMERIZED HIGH ENERGY DENSITY DIELECTRIC FILMS FOR CAPACITORS Final Report, 28 Sep. - 31 Dec. 1982
F. G. Yamagishi Oct. 1983 67 p refs
(Contract NAS3-22828)
(NASA-CR-168233; NAS 1.26:168233) Avail: NTIS HC A04/MF A01 CSCL 11G

High energy density polymeric dielectric films were prepared by plasma polymerization of a variety of gaseous monomers. This technique gives thin, reproducible, pinhole free, conformable, adherent, and insoluble coatings and overcomes the processing problems found in the preparation of thin films with bulk polymers. Thus, devices are prepared completely in a vacuum environment. The plasma polymerized films prepared all showed dielectric strengths of greater than 1000 kV/cm and in some cases values of greater than 4000 kV/cm were observed. The dielectric loss of all films was generally less than 1% at frequencies below 10 kHz, but this value increased at higher frequencies. All films were self healing. The dielectric strength was a function of the polymerization technique, whereas the dielectric constant varied with the structure of the starting material. Because of the thin films used (thickness in the submicron range) surface smoothness of the metal electrodes was found to be critical in obtaining high dielectric strengths. High dielectric strength graft copolymers were also prepared. Plasma polymerized ethane was found to be thermally stable up to 150 C in the presence of air and 250 C in the absence of air. No glass transitions were observed for this material. Author

N84-13311# National Building Research Inst., Pretoria (South Africa).
HIGH ALUMINA CEMENT CONCRETE
J. H. P. vanAardt, T. M. Nemeth, and S. Visser 1982 15 p
(CSIR-BRR-573; ISBN-0-7988-2049-7) Avail: NTIS HC A02/MF A01

Concrete made with locally milled high alumina cement was studied. The mix design is discussed and the properties of the concrete are given. The loss of strength of the concrete in relation to the state of conversion of the high alumina cement is given. S.L.

N84-13312# Royal Aircraft Establishment, Farnborough (England).
RELATIONSHIP BETWEEN THE GLASS TRANSITION TEMPERATURE AND THE CHEMICAL STRUCTURE OF POLYMERS
R. Becker Dec. 1982 60 p refs Transl. into ENGLISH from Faserforsch. und Textiltech. (West Germany), v. 29, no. 6, 1978 p 361-385
(RAE-TRANS-2098; BR89480) Avail: NTIS HC A04/MF A01

A survey is provided on the semiquantitative and quantitative relationships between glass temperature and chemical structure of polymers and between the relationships of the basic parameters affecting the glass temperature. The calculation of T sub g by the structure-related increment method based on the principle of additivity of the properties of constituting elements is discussed. S.C.L.

N84-13313# Westinghouse Defense and Electronic Systems Center, Baltimore, Md.
MM AND T: CERAMIC METAL SUBSTRATES FOR HYBRID ELECTRONICS Final Report
A. B. Timberlake and F. E. Merti Aug. 1983 121 p
(Grant DAAK21-80-G-0076)
(AD-A132514; HDL-CR-83-076-1) Avail: NTIS HC A06/MF A01 CSCL 19/1

The objective was to detail the technology relevant to high volume production of thick film hybrid electronics made with insulated metal substrates. The technology applicable to ordnance

projectile fuze electronics was emphasized. The program was divided into several tasks to explore the critical elements of thick film hybrid manufacturing. First, all physical, thermal, electrical, and chemical properties of commercially available porcelain enameled steel (PES) substrates which affect their thick film performance were measured and analyzed. Next, the properties of numerous thick film conductors, dielectrics, and resistors were complied. Solderability and wire bondability of numerous conductors were evaluated. Properties of three vendors' resistor inks covering the full resistance range were characterized. Effects of firing temperature variation on thick film properties were analyzed. A small pilot production line was implemented using materials and processes established in the above tasks. Two batched totalling 150 units of a moderately complex hybrid fuze amplifier completed thick film fabrication with approximately 75% yield. Ten complete amplifiers were delivered to HDL for test. The feasibility of building ordnance hybrids on PES substrates in large volume is discussed. Factors limiting the feasibility are identified. Areas where material development is necessary are indicated. GRA

N84-13314# Washington State Univ., Pullman. Dept. of Physics.
FRACTO-EMISSION FROM POLYMERS Annual Technical Report, Jun. 1982 - Jun. 1983
J. Thomas Dickinson Jun. 1983 150 p
(Contract N00014-80-C-0213)
(AD-A132462) Avail: NTIS HC A07/MF A01 CSCL 11/9

Progress in the investigation of fracto-emission (FE) from polymers is reported. Measurements characterizing the FE, experiments concerning FE mechanisms, and studies of factors influencing FE are discussed. This work includes: experimental evidence for and presentation of a conceptual model for the charged particle emission mechanisms, studies of electron and positive ion emission from the organic crystal sucrose and from single crystals of RDX. Also included is a review paper on FE from filled and unfilled elastomers. Author (GRA)

N84-13315# California Univ., Berkeley. Dept. of Electrical Engineering.
DIFFUSION AND SORPTION OF CYCLOHEXANE VAPOR IN SBS AND SBR COPOLYMERS
Gerald T. Caneba, David S. Soong, and John M. Prausnitz 30 Aug. 1983 35 p
(Contract N00014-81-K-0516)
(AD-A132397; TR-4) Avail: NTIS HC A03/MF A01 CSCL 11/9

Diffusion and sorption of cyclohexane vapor in styrene-butadiene copolymers were used to study the morphology of an SBS triblock copolymer (29.3 wt % styrene) cast from different solvents. The weight gain or loss of this SBS and several SBR (5, 23, 45 and 85 wt % S content) samples were continuously monitored at 40 C and at penetrant pressures of 30, 60, 90 and 120 torr. Significant differences exist in the equilibrium sorption among the different samples. Possible reasons for this observation are explored. The one corroborated by dynamic mechanical measurements attributes the differences to varying interphase volume fractions. The interphase region separating the PB and PS phases in SBS was assumed to be a continuous profile of equivalent SBR with different S contents. Experimental results, coupled with simple calculations, indicated that the overall interphase volume fraction in the SBS are 0.28 for the MEK/THF-cast (1:9 volume ratio of MEK and THF) sample, 0.15 for the toluene-cast sample, and 0.04 for the cyclohexane-cast sample. GRA

N84-13316# McDonnell Aircraft Co., St. Louis, Mo. Material and Process Development Dept.
PROCESSING SCIENCE FOR AS/3501-6 CARBON/EPOXY COMPOSITES Final Report, 1 Aug. 1981 - 30 Apr. 1983
J. F. Carpenter 8 Sep. 1983 49 p
(Contract N00019-81-C-0184)
(AD-A132323; AD-F630051) Avail: NTIS HC A03/MF A01 CSCL 11/9

The objectives of this program were to investigate the curing behavior of thermosetting matrix resins under conditions relatable to the processing parameters of the companion carbon/epoxy prepreg material and to investigate the interrelationships of volatiles transport, physiochemical and mechanical properties. Author (GRA)

N84-13317# California Univ., Los Angeles. Dept. of Materials Science and Engineering.
CHARACTERIZATION OF CARBON FIBER COMPOSITES USING ACOUSTO-ULTRASONIC TECHNIQUES
Kanji Ono and Ron deSpain Jul. 1983 9 p Repr. from Proc. of 1st Intern. Symp. on Acoustics Emission from Reinforced Composites, Sect. 6.11:20-11:35, p 1, 19-21 Jul. 1983
(Contract N00014-81-K-0011)
(AD-A132305) Avail: NTIS HC A02/MF A01 CSCL 11/9

In order to develop nondestructive evaluation methods for co-cured carbon fiber reinforced plastics (RP), acousto-ultrasonic techniques were studied. Porosity in RP skins and debonding of skins were studied. An effort was made to clearly discriminate these two types of manufacturing irregularities. Stress wave factor techniques were evaluated by determining wave propagation characteristics. R.J.F.

N84-13318# McDonnell-Douglas Research Labs., St. Louis, Mo.
AGING OF POLYMERIC MATERIALS Final Report, 30 Sep. 1981 - 31 Dec. 1982
C. J. Wolf, M. A. Grayson, and D. L. Fanter 31 Dec. 1982 74 p
(Contract N00019-81-C-0392)
(AD-A132250; MDC-Q0798) Avail: NTIS HC A04/MF A01 CSCL 11/9

Changes in the microchemistry of the MY720/diaminodiphenyl sulfone epoxy resin system were investigated as a function of simulated environmental aging. Chemiluminescence (CL) was used to monitor changes in the resin system, samples of which were aged at 35 and 65 C at 0% (RH) (relative humidity), 100% RH, or immersed in liquid water. The reciprocal of the CL is a linear function of the aging interval. The low-temperature thermal decomposition of the cured resin was investigated from 125 to 215 C. The primary decomposition product was propenal. Several other aldehydes were observed; however, they are formed during cure and are not thermal decomposition products. The apparent activation energy for the production of propenal is 67 kJ/mole (16 kcal/mole). Possible mechanisms for the source of this compound are discussed. GRA

N84-13319# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
STORAGE OF SYNTHETIC TURBINE LUBRICANTS UNDER ADVERSE CONDITIONS Final Report, Jun. 1979 - Oct. 1980
Hoover A. Smith and M. A. Schumacher Apr. 1983 60 p
(AF Proj. 3048)
(AD-A132226; AD-E401062; AFWAL-TR-83-2007) Avail: NTIS HC A04/MF A01 CSCL 21/4

The stability of six turbine lubricants consisting of four MIL-L-7808 fluids, one MIL-L-23699 fluid, and one MIL-L-7808 fluid containing a corrosion inhibitor with all being stored under adverse conditions were investigated. Conditions of storage consisted of both sealed containers and open containers exposed to free water of high humidity for periods up to 16 months. Effects of microorganisms were also investigated. Lubricant was periodically examined for changes in appearance, odor, total acid number values, Complete Oil Breakdown Rate Analyzer (COBRA) values and microscopic examination for microbiological activity. This study has shown that the two parameters most effecting long-term storage of turbine lubricants are temperature and free water or high humidity. As the storage temperature increases, the rate of lubricant hydrolysis rapidly increases with hydrolysis being the major mechanism for lubricant degradation under these conditions. One MIL-L-7808 fluid showed superior stability in comparison to the other fluids but not of sufficient degree to provide 16 months storage under high moisture conditions at 100 deg F. Microbiological activity did not effect the rate of lubricant degradation significantly. GRA

N84-13320# Bristol Univ. (England).
GLASS FIBRE/EPOXY RESIN INTERFACE LIFE-TIME PREDICTION Final Report, Apr. 1981 - Apr. 1983
K. H. G. Ashbee, R. Hoael, J. P. Sargent, and Elizabeth Walter Apr. 1983 48 p
(Contract DAJA37-81-C-0214; DA Proj. 1T1-61102-BH-57)
(AD-A132206; AD-E750839) Avail: NTIS HC A03/MF A01 CSCL 11/9

Chemical reaction, adsorption and diffusion in polymers are all enhanced by stress and, as is the case for other materials, localized stresses, since they initiate failures, are more important than overall levels of residual stress. The solutions contained inside interfacial pressure pockets are corrosive and their destructive action, on the bonds responsible for load transfer, is enhanced by residual interfacial stress. There exist no high resolution techniques for measuring localized deformation in non-crystalline materials. In crystals, however, local elastic strain can be detected and measured using Kossel X-ray diffraction and electron beam back scattering diffraction in the SEM, and convergent beam diffraction in the TEM. Each of these facilities has been used to study residual stress close to a-quartz/epoxy resin interfaces in order to establish the general nature and magnitude of interfacial stress in SiO2/epoxy composite materials including GRP. At 40mm from the interface local strain is 2%. The corresponding large interfacial stresses are held responsible for the observed very strong dependence of mechanical damping on interfacial area.
GRA

N84-13321# Massachusetts Univ., Amherst. Materials Research Lab.
RADIOLYSIS OF RESIST POLYMERS. 2: POLY (HALOALKYLMETHACRYLATES) AND COPOLYMERS WITH METHYLMETHACRYLATE
G. N. Babu, A. Narula, P. H. Lu, X. Li, and S. L. Hus Aug. 1983 33 p
(Contract N00014-81-K-0611)
(AD-A132095; TR-2) Avail: NTIS HC A03/MF A01 CSCL 07/3

Homopolymers of 2-fluoroethyl methacrylate (FEMA), 2-chloroethyl methacrylate (CEMA) 2-bromoethyl methacrylate (BEMA), 2,2,2-trichloroethyl methacrylate (TCEMA), 2,3-dibromopropyl methacrylate (DBPMA) and copolymers with MMA over a range of compositions have been synthesized. Gamma-radiolysis yields for scission (Gs), crosslinking (Gx) and radical formation (Gr) were determined. The volatile products were analyzed by GC-MS. Probable mechanisms of radiolysis of all polymers were proposed. Author (GRA)

N84-13322# Singleton Materials Engineering Labs., Knoxville, Tenn.
TESTING OF EPOXY-PHENOLIC COATING FOR LINING CARBON STEEL PIPE
20 May 1983 43 p refs
(DE84-90073; TVA/OP/EDT-83/19) Avail: NTIS HC A03/MF A01

A study was completed to evaluate the performance of an epoxy-phenolic coating material when used as an internal liner for carbon steel pipe. Testing of the pipe was identical to that used in a previous study to evaluate cement mortar lined pipe (CEB 810730 003), so that the relative performance of each material could be compared. Pipes were subjected to bearing, cyclic, torsion, flexural, drop, and impact tests, with test sections being inspected before and after testing to evaluate crack formation and propagation as well as adhesion loss. DOE

N84-13323# Sandia Labs., Albuquerque, N. Mex. Fluid and Thermal Sciences Dept.
FINITE-ELEMENT ANALYSIS OF AN EPOXY-CURING PROCESS
D. K. Gartling, C. E. Hickox, and J. W. Nuniato 1983 6 p refs Presented at the 5th Intern. Conf. on Finite Elements, Austin, Tex., 26 Sep. 1983
(DE84-000452; SAND-82-2903C; CONF-8309149-1) Avail: NTIS HC A02/MF A01

A finite element numerical procedure is used to study the curing of an epoxy compound. The problem involves the gelation of an incompressible liquid due to an exothermic chemical reaction. Nonuniform temperature fields produce buoyancy-driven fluid motions that interact with the solidifying material. The numerical simulations provide temperature histories and the progression of the gel front that are compared with experimental data. DOE

N84-13324# University of Southern Mississippi, Hattiesburg. Dept. of Polymer Science.
IMPROVED POLYMERS FOR ENHANCED-OIL-RECOVERY SYNTHESIS AND RHEOLOGY Annual Report, Oct. 1981 - Sep. 1982
Charles L. McCormick, R. D. Hester, Hermann H. Neidlinger, and G. C. Wildman Oct. 1983 225 p refs
(Contract DE-AS19-80BC-10321)
(DE83-017371; DOE/BC-10321/12; AR-5) Avail: NTIS HC A10/MF A01

The structure/property/performance interrelationships of water soluble polymers to aid industry in commercial production of polymers was examined. During the past the following have been accomplished: synthesis of model dextran-q-poly(acrylamide-co-sodium acrylates); synthesis of model dextran-q-poly(acrylamide-co-sodium-2-acrylamido-2-methylpropane sulfonates); characterization of model copolymers by elemental analysis, C-13NMR, and viscometry; study of dilute solution properties of the models including the effects of temperature, salt, pH; rheological studies of model graft copolymers; development of mathematical models, new calibration functions, analytical methods, and data acquisition techniques for aqueous size exclusion chromatography; application of quasielastic light scattering techniques to the study of hydrodynamic volume concepts; preferential and overall solvation studies of AN/NaA and AM/NaAMPS copolymers; study of phase behavior of model polymers in mono and multivalent electrolytes at different polymer and salt concentrations as a function of temperature; education and training of students in basic energy research. DOE

N84-13325# Pacific Northwest Lab., Richland, Wash.
RELATIONSHIPS BETWEEN STRENGTH, ELECTRICAL CONDUCTIVITY, AND DENSITY FOR OXIDIZED PGX GRAPHITE
W. C. Morgan and J. M. Prince Jul. 1983 3 p refs Presented at the 16th Am. Carbon Soc. Biennial Conf., La Jolla, Calif., 18-22 Jul. 1983
(Contract DE-AC06-76RL-01830)
(DE83-016184; PNL-SA-10932; CONF-830711-5) Avail: NTIS HC A02/MF A01

The core of a High Temperature Gas-Cooled Reactor (HTGR) rests on massive graphite core support blocks; which, in turn, are supported by core support posts. PGX graphite was used for the core support blocks of the Fort St. Vrain HTGR (the only operating HTGR); and, evidently, is the leading candidate material for use in advanced HTGRs. Therefore, PGX was chosen for the initial tests on the use of eddy current techniques to monitor strength changes as a result of oxidation. The results of these initial tests showed that both compressive strength and electrical conductivity correlated very well with density. However, only a single log of PGX was used for the initial tests; therefore, it was necessary to determine if the correlations could be extended to other logs of PGX. DOE

N84-13326# Argonne National Lab., Ill.
FIELD MAINTENANCE OF RADIATION-SHIELDING WINDOWS AT HFEF
Dale A. Tobias 1983 5 p refs Presented at the American Nuclear Society Winter Meeting, San Francisco, 30 Oct. - 4 Nov. 1983
(Contract W-31-109-eng-38)
(DE83-015376; CONF-831047-73-Summ) Avail: NTIS HC A02/MF A01

The achievement of excellent viewing through hot cell shielding windows does not occur by chance. Instead, it requires a well planned and executed program of field maintenance. The lack of

such a program is a major factor when a hot cell facility has poor window viewing. At HFEF, all preventive maintenance is performed by one group of trained technical support personnel under the immediate direction of a systems engineer, who has responsibility for the shielding windows. Window maintenance is prescheduled and recorded by being incorporated into the computerized Maintenance Data System (MDS). Measurements of window light transmission are scheduled annually to determine glass browning or oil cloudiness conditions within the window tank. The tank oil is sampled and chemically analyzed annually to determine the moisture content, the acidity, and the probable deterioration rate caused by irradiation. DOE

N84-13327# Purdue Univ., Lafayette, Ind. School of Nuclear Engineering.
MECHANISMS OF ELEVATED-TEMPERATURE RUPTURE IN SINGLE-PHASE CERAMICS Progress Report, 1 Feb. 1983 - 31 Jan. 1984
A. A. Solomon Sep. 1983 109 p refs
(Contract DE-AC02-80ER-10591)
(DE83-017779; DOE/ER-10591/T1; COO-10591-4) Avail: NTIS HC A06/MF A01

An analytical study was undertaken to determine the importance of pore size distributions, assuming the basic mechanism of pore growth or shrinkage occurs by diffusive mass transport. Results show that the total driving force dominates the dimensional changes. Small pores tend to sinter and large pores swell. The effect of surface tension was theoretically included in nonequilibrium pore growth models, but shown to be generally unimportant in this growth mode. A second area of investigation was pore growth in UO2. Both internal gas pressure, and tensile creep tests were used to study pore growth under different driving forces and states of stress. Both investigations showed driving force dependencies, DF sup n, with n somewhat greater than one. The sectioning techniques developed permitted pore/grain boundary dihedral angles and the amount of pore growth to be accurately measured. No pore sharpening was observed. The tensile creep study of ultrahigh purity CoO also continued. The hot pressing of UO2 is also being investigated to amplify previous results for stoichiometric UO2. DOE

N84-13328# Sandia Labs., Albuquerque, N. Mex.
AUTOMATED THERMAL CONDUCTIVITY PROBE AND APPLICATIONS TO POWDERS
W. D. Drotning 1983 17 p refs Presented at 18th Intern. Thermal Conductivity Conf., Rapid City, S.D., 3 Oct. 1983
(Contract DE-AC04-76DP-00789)
(DE84-000451; SAND-83-2084C; CONF-8310163-2) Avail: NTIS HC A02/MF A01

A thermal conductivity probe was developed for measurements of powders and porous media from ambient temperature to 1300 K in vacuum or an inert gas atmosphere. Automated data acquisition and graphical analysis programs were developed in FORTRAN for use with a laboratory mini-computer. Nonlinear data analysis techniques are available which accounts for the thermal probe response due to contact resistance and probe thermal mass effects. Programs were developed with thermal BASIC for use with a small, portable desktop computer system. Examples of the use of the probe and data acqisition and analysis system are shown for measurement of the effective thermal conductivity of ceramic and metal powders. DOE

N84-13329# Los Alamos Scientific Lab., N. Mex.
STRUCTURAL PERFORMANCE OF CERAMICS IN A HIGH-FLUENCE FUSION ENVIRONMENT
F. W. Clinard, Jr., G. F. Hurley, L. W. Hobbs, D. L. Rohr, and R. A. Youngman 1983 8 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19-22 Sep. 1983
(Contract W-7405-eng-36)
(DE84-001311; LA-UR-83-2742; CONF-830942-46) Avail: NTIS HC A02/MF A01

The ceramics MgAl2O4, Al2O3 (single crystal), Si3N4, and a SiC/graphite laminate were irradiated to approx. 2 x 10(26) (E > 0.1 MeV) at 680 and 815K. Spinel exhibited near-zero dimensional change, while Al2O3 and Si3N4 swelled approx. 3 vol % and 1 vol % respectively. Strength of MgAl2O4 was increased, while strength of Al2O3 and Si3N4 were not greatly altered. The SiC/graphite composite, tested only at 680K, suffered almost complete delamination as a result of swelling of the SiC and densification of the graphite. These results are discussed in terms of microstructural alterations and related to various fusion applications. DOE

N84-13330# Los Alamos Scientific Lab., N. Mex.
RELAXATION IN SPIN GLASSES: SIMILARITIES AND DIFFERENCES FROM ORDINARY GLASSES
K. L. Ngai (Naval Research Lab., Washington, D.C.), A. K. Rajagopal (Louisiana State Univ., Baton Rouge), and C. Y. Huang 1983 13 p refs Presented at MMM Conf., Pittsburgh, 8 Nov. 1983 Sponsored in part by the Navy Submitted for publication
(Contract W-7405-eng-36)
(DE84-001719; LA-UR-83-2929; CONF-831187-6) Avail: NTIS HC A02/MF A01

Relaxation phenomena have become a major concern in the physics of spin glasses. There are certain resemblances of these relaxation properties to those of ordinary glasses. The relaxation properties of spin glasses near the freezing temperature are compared with those of glasses near the glass transition temperature. There are remarkable similarities between them and they both are in conformity with two coupled universality relations predicted by a model of relaxations in condensed matter. DOE

N84-13331# Bendix Corp., Kansas City, Mo.
VAPOR DEGREASER/ULTRASONIC CLEANER SOLVENT EVALUATION Final Report
J. K. Phipps Nov. 1983 15 p refs
(Contract DE-AC04-76DP-00613)
(DE84-002015; BDX-613-2990) Avail: NTIS HC A02/MF A01

An organic solvent with cleaning properties similar to trichloroethylene, but with a lower boiling point and less toxicity, was sought for the vapor degreasing/ultrasonic cleaning of printed circuit boards. For this study, 1,1,1-trichloroethane was investigated because of its similarity in solvency properties and vapor densities. Using either solvent, circuit boards were equal in cleanliness when measured by the evaporative rate analysis technique. Based on this investigation, 1,1,1-trichloroethane was found to meet all criteria as a substitute for trichloroethylene. DOE

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N84-13332*# Southwest Research Inst., San Antonio, Tex.
INVESTIGATION OF SOURCES, PROPERTIES AND PREPARATION OF DISTILLATE TEST FUELS
John N. Bowden and Jimell Erwin Nov. 1983 69 p refs
(Contract NAS3-22783)
(NASA-CR-168227; NAS 1.26:168227; SwRI-6682/2) Avail: NTIS HC A04/MF A01 CSCL 21D

Distillate test fuel blends were generated for prescribed variations in composition and physical properties. Fuels covering a wide range in properties and composition which would provide a matrix of fuels for possible use in future combustion research programs were identified. Except for tetralin the blending components were all from typical refinery streams. Property variation blends span a boiling range within 150 C to 335 C, freezing point -23 C to -43 C, aromatic content 20 to 50 volume percent, hydrogen content 11.8 to 14.2 mass percent, viscosity 4 and 11 cSt (-20 C), and naphthalenes 8 and 16 volume percent. Composition variation

blends were made with two base stocks, one paraffinic and the other napthenic. To each base stock was added each of three aromatic type fuels (alkyl benzenes, tetralin, and naphthalenes) for assigned initial boiling point, final boiling point, and hydrogen content. The hydrogen content was 13.5 mass percent for the paraffinic base stock blends and 12.5 mass percent and 11.5 mass percent for the naphthenic base stock blends. Sample 5-gallon quantities of all blends were prepared and analyzed. Author

N84-13333# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

A COMMENT ON THE PLATEAU COMBUSTION MECHANISM OF THE DOUBLE-BASE PROPELLANTS

Ma Xiegi 25 Aug. 1983 25 p Transl. into ENGLISH from Binggong Xuebao (China), no. 1, Feb. 1982 p 48-57

(AD-A132551; FTD-ID(RS)T-0593-83) Avail: NTIS HC A02/MF A01 CSCL 21/8

In a certain pressure range, the combustion rate of a double base propellant is almost unrelated to pressure. Subsurface condensed phase and gas phase theories for this mechanism are examined as well as the evidence obtained. Methods for surface temperature measurement and the direction of further research in a real combustion system are discussed. Problems identified relate to the effect of carbon on combustion, ultraviolet absorption, the effect of copper on lead, and the effect of inert additives. A.R.H.

N84-13334# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

WEIGHTLESSNESS AND MANAGEMENT OF LIQUID ROCKET PROPELLANT

Huang Yannian 25 Aug. 1983 8 p Transl. into ENGLISH from Hangtian (China), no. 5, 1982 p 8-10

(AD-A132516; FTD-ID(RS)T-1018-83) Avail: NTIS HC A02/MF A01 CSCL 21/9

The influence and consequences of weightlessness on liquid rocket propellants are discussed. Management methods for liquid propellants, which guarantee the normal operation of the main engine are described. Different methods and their application are outlined. They are as follows: (1) the active method, the propellant is stored in plastic bags or metal waveline containers to be squeezed into the engine with an external force during firing; (2) semiactive method, the liquid propellant is kept at a designated position in the container by artificial gravitation or electromagnetic field; and (3) the passive method, the capillary effect of seperation plated and grids is used to keep the propellant in the designated location of the container. E.A.K.

N84-13335# Army Mobility Equipment Research and Development Command, Fort Belvoir, Va.

THE DETERMINATION OF RESEARCH OCTANE NUMBER OF GASOLINE FUELS BY OCTANE ANALYZER Interim Report

Shing-Bong Chen Apr. 1983 22 p

(AD-A132427; MERADCOM-2380) Avail: NTIS HC A02/MF A01 CSCL 21/4

The Foxboro Laboratory Octane Analyzer was investigated as an improved, more reliable, and somewhat less complicated method for assessing octane quality. The Octane Analyzer's responses (induction time, peak area, and peak height) were correlated with the Research Octane Number (RON), the Motor Octane Number (MON), and the Antiknock Index (RON + MON/2) as determined by ASTM D2699 and D2700 engine test methods. Among the three measured responses, peak height was found to give best correlation. In addition, the correlation was better with the RON and the Antiknock Index than it was with the MON. The Octane numbers of Gasohols and Coordinating Research Council (CRC) full-boiling range unleaded fuels did not correlate with the Analyzer's responses as well as did commercial unleaded gasoline fuels. In conclusion, the Octane Analyzer can be used as a screening test or as an alternate method for measuring the octane number of gasoline fuels. GRA

N84-13336# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

DETERMINATION OF A JET FUEL METAL DEACTIVATOR BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY Final Report, 1 Jan. - 4 Jul. 1980

Paul C. Hayes, Jr. Jun. 1983 47 p

(AF Proj. 3048)

(AD-A132220; AD-E401062; AFWAL-TR-82-2128) Avail: NTIS HC A03/MF A01 CSCL 21/4

This technical report describes an analytical method that qualitatively identifies and quantitatively determines a metal deactivator additive used in Air Force JP-4 jet fuel. Relative retention time calculations, together with ultraviolet absorbance ratios at various wavelengths, were highly specific in assigning the tentative identification of the additive. A recovery standard that doubled as the internal reference standard for relative retention time measurements was crucial in correcting the found metal deactivator ppm level for losses in sample transfer, sample concentration, dilution, etc. A precision statement, reflecting the quantitative reliability of the method, cited +/- 0.5 ppm as the 95% confidence intervals for the true value of the predicted amount from the calibration curve for the metal deactivator in the 20-150 ppm range, after a 20-fold fuel concentration step. This crucial concentration step was necessary since the metal deactivator was at a level specified not to exceed 5.8 mg/liter, i.e. 5.8 parts per million (weight/volume) in JP-4 fuel. Author (GRA)

N84-13337# Southwest Research Inst., San Antonio, Tex. Army Fuels and Lubricants Research Lab.

MIDDLE DISTILLATE FUEL STABILITY CHARACTERISTICS: A REVIEW Interim Report, Oct. 1981 - Jan. 1983

G. H. Lee, II and L. L. Stavinoha Jan. 1983 46 p

(Contract DAAK70-82-C-0001; DA Proj. 1T1-61102-AH-51)

(AD-A132156; AD-E850405; SwRI-6800-148/2; AFLRL-168) Avail: NTIS HC A03/MF A01 CSCL 21/4

Middle distillate fuel stability is of prime concern when long-term storage is necessary. Extensive work has been undertaken over the past half century in an attempt to establish the true chemical mechanism by which this degradation takes place. This review was undertaken as part of a basic research program having as its goal the definition of fuel deterioration and additive-inhibition mechanisms. It is intended to report some of the more pertinent highlights so that the reader may obtain an overview of the current state-of-the-art in fuel stability research. An annotated bibliography has also been included more in-depth information may be readily obtained. Author (GRA)

N84-13338# Coordinating Research Council, Inc., Atlanta, Ga.

HANDBOOK OF AVIATION FUEL PROPERTIES

1983 127 p

(Contract DAAK70-81-C-0128)

(AD-A132106; AD-E800784; CRC-530) Avail: NTIS HC A07/MF A01 CSCL 21/4

The purpose of this document is to provide a convenient source of information on properties of aviation fuels for reference use. The data presented herein include: Description of Fuels; Specifications; Aviation Gasoline (Av Gas); Turbine Fuels; Missile Fuels; Composition of Fuels; Hydrocarbon Missile Fuels; Fuel Density; Viscosity; Surface Tension; Volatility; Low-temperature Properties; Thermal Properties; Electrical Characteristics; Flammability and Ignition Characteristics; Bulk Modulus; Solubility of Gases; Solubility of water; Thermal Oxidation Stability; User Problems; Fuel Contaminants; Fuel Lubricity Material Compatibility; and Toxicity. GRA

N84-13339# California Univ., Livermore. Lawrence Livermore Lab.

BOUND AND FREE MOISTURE IN EXPLOSIVES AND PLASTICS

R. L. Ward, J. W. Pyper, T. Felver (Sandia National Lab., Livermore, Calif.), and L. P. Althouse 1983 17 p refs Presented at the 11th DOE Compatibility Meeting, Livermore, Calif., 18-20 Oct. 1983

(Contract W-7405-eng-48)

(DE84-001402; UCRL-89188-Rev-1; CONF-8310111-4-Rev-1)

Avail: NTIS HC A02/MF A01

The prediction of the amount of moisture that can become free inside a nuclear weapon during its stockpile lifetime is an important compatibility issue. This free moisture can promote the corrosion of critical parts or production of hydrogen which is deleterious to system electronics. A program to develop the best method of measuring free and bound moisture in organic solids is discussed. A review of the recent literature on moisture analysis yielded a complete structural classification scheme for water in solids. Proton nuclear magnetic resonance of triaminotrinitrobenzene (TATB) and its plastic bonded derivatives reveals a Pake doublet spectrum with a superimposed mobile water peak. Mobile water concentrations without the use of standards can be measured to about 0.25%. The measurement of lower concentrations of water is difficult because of integration and signal-to-noise problems. The use of standards allows measurement of water to about 0.02%. Experiments were not able to separate out rigidly bound water, if it is present, from TATB protons. In an evaluation of dielectric spectroscopy of TATB, no H2O dispersion peaks were detected in the temperature range -120 to 230 C at frequencies of 1 and 100 kHz. This method is apparently not sensitive enough to use in this case. DOE

N84-13340# Southwest Research Inst., San Antonio, Tex.
ALTERNATIVE FUELS FOR MEDIUM-SPEED DIESEL ENGINES (AFFMSDE) PROGRAM: SLURRIES, EMULSIONS, AND BLENDED-FUEL EXTENDERS; CYLINDER WEAR MEASUREMENTS, STAGED INJECTION Final Report
Q. A. Baker, Jr., J. F. Wakenell, and S. Ariga Aug. 1983 186 p refs Sponsored in part by Federal Railroad Administration and Association of American Railroads
(Contract DE-AC01-78CS-54266)
(DE84-000524; DOE/CS-54266/3; SwRI-5361-003;
FRA-ORD-80-40.111; AAR-R545) Avail: NTIS HC A09/MF A01

The third year of research activity on an ongoing research, development and demonstration effort to investigate the use of alternative fuels for medium-speed engines is described. Tests were performed using laboratory medium-speed diesel engines to define the ability of these engines to operate on alternative fuels, the fuel property limits that the engines can tolerate, the problems associated with alternative fuels use, and methods to improve fuel tolerance and to overcome the problems identified. The fuels studied during the Phase III program were alcohol-in-diesel fuel emulsions, water-in-diesel fuel emulsions, sunflower oil/diesel fuel blends, No. 6 fuel oil/diesel fuel blends, and a carbon black/diesel fuel slurry. Also studied were methods to measure cylinder liner and piston ring wear rates in a short period of engine operation. Finally, staged injection was investigated as a means of improve engine performance on low cetane number fuels. DOE

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N84-13341# Building Research Inst., Tokyo (Japan).
PROCEEDINGS OF THE 6TH JOINT PANEL MEETING: UJNR PANEL ON FIRE RESEARCH AND SAFETY
1982 932 p refs Meeting held in Tokyo, 10-14 May 1982
Avail: NTIS HC A99/MF A01

Fire is a destructive force which must be not only controlled, but also prevented. Causing death, injury, financial loss, and destruction of property, researchers seek to find solutions to eliminate its threat. Attention was given to the following areas: building system and smoke control, human behavior, modeling of fires, toxicity of gases, and fire codes. For individual titles, see N84-13342 through N84-13379.

N84-13342# Tokyo Univ. (Japan).
CURRENT RESEARCHES ON FIRE RETARDANT MATERIALS IN JAPAN
Kazuo Akita *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 15-22 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The use of fire retardant materials is a very effective way to decrease human loss in the event of building fires. However, smoke and toxicity in a fire, which is the collateral phenomena due to fire retardant were paid more attention than the fire retardant materials themselves. This is because much damage is brought about by smoke and toxicity in a fire. Research papers on fire retardant materials are largely concerned with pyrolysis and combustion products. Twenty-eight papers are reviewed and classified into the following three categories: flame retarding mechanism and evaluation of flammability, pyrolysis and gaseous products of flame retardant materials, and development of flame retardant materials. Author

N84-13343# Clemson Univ., S.C. School of Textiles.
FIRE AND SMOKE RETARDANTS Progress Report
M. J. Drews *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 23-32 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

Despite a reduction in Federal regulatory activity, research concerned with flame retardancy and smoke suppression in the private sector appears to be increasing. This trend seem related to the increased utilization of plastics for end uses which traditionally have employed metal or wood products. As a result, new markets have appeared for thermally stable and fire resistance thermoplastic materials, and this in turn has spurred research and development activity. In addition, public awareness of the dangers associated with fire has increased as a result of several highly publicized hotel and restaurant fires within the past two years. The consumers recognition of flammability characteristics as important materials property considerations has increased. The current status of fire and smoke retardant chemistry and research are summarized. Author

N84-13344# National Bureau of Standards, Washington, D.C. Center for Fire Research.
FIRE INVESTIGATION Progress Report
Alan Gomberg *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 39-46 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

There was considerable progress made on several fronts of fire investigation in the United States in recent years. Progress was made in increasing the quantity of fire investigation and reporting, through efforts to develop the National Fire Incident Reporting System. Improving overall quality of fire investigation is the objective of efforts such as the Fire Investigation Handbook, which was developed and published by the National Bureau of Standards, and the upgrading and expanding of the "dictionary" of fire investigation and reporting, the NFPA 901, Uniform Coding for Fire Protection, system. The science of fire investigation as furthered also by new approaches to post fire interviews being developed at the University of Washington, and by in-depth research into factors involved in several large loss fires, including the MGM Grand Hotel in Las Vegas. Finally, the use of special study fire investigations - in-depth investigations concentrating on specific fire problems - is producing new glimpses into the nature of the national fire problem. A brief description of the status of efforts in each of these areas is discussed. Author

N84-13345# Fire Research Inst., Tokyo (Japan).
SPRINKLERS Progress Report
Nobuo Jiromaru *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 48-52 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The use, regulatory requirements, test facilities, and technical reports on sprinklers are reviewed. B.G.

N84-13346# Factory Mutual Research Corp., Norwood, Mass.
AUTOMATIC SPRINKLERS Progress Report
Raymond Friedman *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 53-102 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

A program to refine the optimum use of sprinklers to protect "high-challenge" storage in industry is being conducted by FMRC. This latter work is in midcourse and very little is published as yet, but the outline of the effort is presented. Author

N84-13347# Building Research Inst., Tokyo (Japan).
BUILDING SYSTEMS AND SMOKE CONTROL Progress Report
K. Kawagoe, T. Wakamatsu, Y. Morishita, and T. Yamana *In its* Proc. of the 6th Joint Panel Meeting 1982 p 103-106 (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The cost effectiveness of different approaches to fire prevention - sprinklers and detectors, increased use of smoke control devices, increased flammability standards, increased public education, increase fire prevention efforts, increased public fire services, etc. - need to be studied further as a guide to determining the emphasis appropriate for each. It is clear that detectors and sprinklers are making a difference in the fight to reduce fire losses. With continued effort the detectors' and sprinklers' full potential for saving lives and property from fire can be realized. Author

N84-13348# National Bureau of Standards, Washington, D.C. Center for Fire Research.
BUILDING SYSTEMS AND SMOKE CONTROL
H. E. Nelson *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 107-115 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

Different systems applied to varying levels of activities in building systems and smoke control are reported. The activities in building systems are divided into projects related to: probabilistic systems, deterministic systems, pragmatic approaches, optimization concepts, educational information and information activities. E.A.K.

N84-13349# Building Research Inst., Tokyo (Japan).
PRESENT STATE OF RESEARCH IN JAPAN ON TOXICITIES OF GASES DURING FIRE
Koichi Kishitani, Fumiharu Saito, and Shyuitsu Yusa *In its* Proc. of the 6th Joint Panel Meeting 1982 p 116-132 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

Research on toxicities of gases during fire and gas toxicity experiments using animals conducted in full size fire tests is reported. The following tests were conducted: (1) analyses of formaldehyde, acrolein, and HCN; (2) analyses of smoke particulates; and (3) types and rates of generation of combustion products, and the investigation of the relationship between CO and CO2 generation and combustion conditions. The relationship between conditions of maximum emission of CO and CO2 is also investigated. E.A.K.

N84-13350# Foundation for Fire Safety, Rosslyn, Va.
SMOKE INHALATION INJURY Progress Report
M. Birky *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 133-139 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The cause of death by fires was studied. The present results and information are, however, not enough to reduce loss of life or inhalation injury. The magnitude and type of inhalation injury for civilians and firefighters represents the most inadequately defined human element of accidental fires. Little information is available on compounds other than carbon monoxide, which are resonsible for respiration injury or toxicological syndrome. Effective treatment methods for inhalation victims and studies on fatalities, inhalation injury and animals are suggested. E.A.K.

N84-13351# Kansai Univ., Osaka (Japan).
HUMAN BEHAVIOR Progress Report **c53**
Saburo Horiuchi and Tadahisa Jin *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 140-144 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The decrease in thinking power and memory in fire smoke was studied. The result of inspection to folding type ladder evacuation equipment installed in each balcony of high residential buildings are considered. Sound guidance for evacuation, and effect of carbon monoxide on firefighters are examined. E.A.K.

N84-13352# Maryland Univ., College Park.
HUMAN BEHAVIOR Progress Report **c53**
John L. Bryan *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 146-151 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

Human behavior and fire research and safety were studied. The studies include: (1) questionnaire of participants in the MGM Grand Hotel fire; (2) behavior response patterns in fire situations in health care occurancies; (3) creation of a fire safety evaluation system for group homes for the developmentally disabled; (4) the waking effectiveness of household smoke and fire detection devices; (5) development of an annotated bibliography on human behavior and fire emergencies; (6) review of code provisions and the technical literature; and (7) development of a behavior based computer simulation of emergency egress during fires. E.A.K.

N84-13353# Tokyo Univ. (Japan). Dept. of Reaction Chemistry.
RECENT JAPANESE PROGRESS IN FIRE MODELING
Kazuo Akita, Takao Wakamatsu (Building Research Inst., Tokyo), and Yuji Hasemi (Building Research Inst., Tokyo) *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 152-156 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

Recent works on mathematical fire modeling, mechanism of flame and fire spread, flashover and flow characteristics in fire were reviewed. Studies include: (1) mathematical fire modeling; (2) mechanism of flame and fire spread; (3) flashover; (4) air movement in fire. E.A.K.

N84-13354# National Bureau of Standards, Washington, D.C. Center for Fire Research.
RECENT US PROGRESS IN FIRE GROWTH MODELING
James Quintiere *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 158-171 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

Work done on fire research is reviewed. The prediction of fire growth phenomena is emphasized. The component processes to simulation models of fire growth in enclosures was studied and includes smoldering, ignition, material properties, burning rate, flame radiation, fire plumes, heat transfer, flame spread, compartment fire dynamics, and special applications of compartment fire models. E.A.K.

N84-13355# Fire Research Inst., Tokyo (Japan). Safety Section.
STUDIES OF EMOTIONAL INSTABILITY IN SMOKE FROM FIRES: DECREASE OF THINKING POWERS AND OF MEMORY IN FIRE SMOKE
Tadahisa Jin *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 180-190 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The effect and degree of smoke concentration on the reduction in thinking and memory was studied. The change in memory and thinking power was estimated by the change in correction ratio for mental calculation in various smoke concentrations. The

reduction of memory in a smokey environment estimated by the correction ratio for remembering the order of four color panels which were shown before smoke exposure. It is found that it is difficult to evaluate the relationship between the reduction in thinking power against smoke concentration, and relationship between the reductions of memory against smoke concentration. E.A.K.

N84-13356# Building Research Inst., Tokyo (Japan).
A STUDY ON SOUND GUIDANCE FOR EVACUATION: EFFECT OF MEGAPHONED EVACUATION GUIDANCE IN SMOKE
Yuichi Watanabe *In its* Proc. of the 6th Joint Panel Meeting 1982 p 204-211 (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

Tests conducted to determine the effectiveness of megaphone evacuation guidance for people lost in smoke are discussed. Two types of voice guidance were used: a direct live voice, instructing the subject to go left or right as he was watched; and a taped voice mechanically broadcasted every five seconds. The subjects' response to obstacles was also observed. Guidance with a live voice resulted in less smoothness of walking than the tape recording, but was more effective owing to its reassuring nature. M.G.

N84-13357# Tokyo Fire Dept. (Japan). Fire Science Lab.
EFFECT OF CARBON MONOXIDE (CO) ON FIREFIGHTERS
I. Igoshi *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 212-217 (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The results of studies to determine the amount of CO gas inhaled by firefighters during their firefighting with comparison between smokers and nonsmokers are discussed. It was found that the blood CO concentration after firefighting operations was considerably higher than in normal time, and that even normal time concentrations were higher in firefighters than in fire academy trainees. Smoking was found to be a major factor in increasing CO concentration. M.G.

N84-13358# Maryland Univ., College Park. Dept. of Fire Protection Engineering.
THE MGM GRAND HOTEL FIRE: A CASE STUDY OF HUMAN REACTION TO FIRE **c53**
John L. Bryan *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 218-250 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

Results of a questionnaire study involving the guests registered in the MGM Grand Hotel on the night of the fire are examined. Means and time of fire awareness, specific response actions, and evacuation analysis are discussed. M.G.

N84-13359# Maryland Univ., College Park. Dept. of Fire Protection Engineering.
PROJECT PEOPLE 2: AN EXTENDED INTERVIEW STUDY OF BEHAVIOR RESPONSE PATTERNS IN HEALTH CARE FACILITY FIRE INCIDENTS
John L. Bryan *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 251-281 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The data collected in a taped interview study involving a population of 150 facility staff personnel, 53 fire department personnel and 9 patients are presented and discussed. A physical examination and analysis of the fire incident area of the facility was conducted by experienced fire protection engineers to determine the physical area of fire origin with the flame and smoke propagation patterns. Fire department personnel were interviewed to obtain observations of flame and smoke propagation. Facility personnel and patients were interviewed to determine the human behavior responses of the participants during the fire incident and to determine their perception of the fire incident threat. M.G.

N84-13360# National Bureau of Standards, Washington, D.C. Center for Fire Research.
EMERGENCY EVACUATION FLOW MODELS
Harold E. Nelson *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 282-322 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

Four emergency evacuation flow models developed by the National Bureau of Standards and the National Research Council of Canada are described. The four are: EVACNET, a network optimization model designed to evaluate mass evacuation flows in large complex buildings; BFIRES-2, a simulation model designed for smaller facilities with emphasis on the decision process and resultant actions; Escape and Rescue Model, a network model capable of simulating both egress of capable persons and rescue of those needing assistance; and Effective Width Model, a formula for determining the egress capacity of stairwells. M.G.

N84-13361# National Bureau of Standards, Washington, D.C.
ESCAPE AND RESCUE MODEL
Daniel Alvord and Harold E. Nelson *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 323-343 ref (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The Escape and Rescue model is a discrete-event simulation program written in Simscript. It was developed to simulate the emergency movement involved in escape and/or rescue of people from a Board and Care Home housing a group of persons with varying degrees of physical or mental disabilities along with a small live-in staff. It may, however, be used in a much more general setting. It can reasonably handle a building with up to 100 residents and 100 rooms. M.G.

N84-13362# National Research Council of Canada, Ottawa (Ontario).
EFFECTIVE-WIDTH MODEL FOR EVACUATION FLOW
J. I. Pauls *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 344-354 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

A formula for determining the egress capacity of stairwells, the Effective Width Model, is described. The effective-width model for evacuation flow is derived from an empirical data base developed from evacuation drills where exit stairs were intensively used by crowds of evacuees; additional data came from detailed observations in large public-assembly facilities where the normal movement of people was observed using film and video recording techniques. M.G.

N84-13363# National Bureau of Standards, Washington, D.C. Center for Fire Research.
MEASURING EVACUATION DIFFICULTY
Harold E. Nelson, N. E. Groner, and B. M. Levin *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 356-379 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

A measurement system developed to measure the difficulty, in terms of relative time, that a group of individuals of mixed capabilities would have in escaping from a burning residence is discussed. The concept basically involves determining which occupants must have assistance to evacuate, the amount of assistance that would be needed, the amount of assistance available, and the promptness of response of such assistance. An evacuation difficulty index is derived by summing the total needs and dividing that value by the sum of the assistance available. The result produces an index value that is felt to be approximately linear in terms of relative escape time in any given building. The index produced is used in a recently developed Fire Safety Evaluation System for Board and Care Homes as the determinant of the level of facility safeguards to be required. R.J.F.

N84-13364# Tokyo Univ. (Japan). Dept. of Reaction Chemistry.
MODELING OF COMPARTMENT FIRES
Ichiro Nakaya and Kazuo Akita *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 391-417 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

A mathematical model of fires in compartments which simulate for various sizes of compartments and fuel rates is discussed. The modeling was made for fully developed fires under rich fuel conditions. R.J.F.

N84-13365# Tokyo Univ. (Japan). Dept. of Reaction Chemistry.
NEW MODELING OF COMPARTMENT FIRES AND PROBLEM OF FLASHOVER
Hisahiro Takeda and Kazuo Akita *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 419-450 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

A new model of compartment fires with liquid or thermoplastic fuels was proposed in which the new concept of the combustion efficiency based on the mixing process of the fuel gas and fresh air was considered. A simple one zone model was used in order to demonstrate the effect of the mixing process. Theoretical results were in good agreement with the experimental results of methanol and polymethyl methacrylate compartment fires, and especially the scale effect of the compartment was predicted successfully. Further, the whole aspect of the compartment fire behavior was presented, and the upper and lower limits of the discontinuous jump of burning rate were decided. In addition to these theoretical results, the experimental approach to the transient fire behavior was conducted to investigate the problem of flashover. R.J.F.

N84-13366# Building Research Inst., Tokyo (Japan).
THERMAL INSTABILITY IN TRANSIENT COMPARTMENT FIRE: AN APPROACH TO CHARACTERIZE FLASHOVER AND ESTIMATE ITS MECHANISMS **c25**
Yuji Hasemi *In its* Proc. of the 6th Joint Panel Meeting 1982 p 451-461 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

One approach to characterize flashover in transient compartment fire and to clarify the physical or chemical processes which promote flashover is shown. This approach correlates the onset of flashover with the appearance of thermal instability, which is represented mathematically by the irregularity of the Jacobian of the energy conservation equations describing the growth of fire. The process promoting flashover is defined as those which cause thermal instability, and the discriminants to investigate the processes promoting thermal instability are derived. Some typical examples of the processes promoting flashover are studied.
Author

N84-13367# Building Research Inst., Tokyo (Japan).
SIMILARITY ANALYSIS OF THE FLOW CHARACTERISTICS IN DIFFUSION FLAMES **c25**
Yuji Hasemi *In its* Proc. of the 6th Joint Panel Meeting 1982 p 462-467 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The modeling of diffusion flame for predicting its practical properties, such as centerline velocity, excess temperature or air entrainment to the flaming region is discussed. These properties were conventionally estimated using the Steward's model, but recent experimental works on flame behavior do not support some of the assumptions employed in the derivation of this model. The equations of the flow in diffusion flames are analyzed, paying attention to these experiments. The analysis is made under the following assumptions. The influence of density change due to temperature change can be evaluated by the Boussinesq approximation. The reaction rate at every height is proportional to the entrained air at the height. The centerline excess temperature is constant, and the flame is columnar shaped. R.J.F.

N84-13368# Seikei Univ., Tokyo (Japan). Dept. of Mechanical Engineering.
SCALING LAWS ON FIRE SPREAD **c25**
Richard I. Emori, Yasuo Iguchi, and Kozo Saito (Princeton Univ., N.J.) *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 469-495 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The objective was to derive the scaling laws on fire spread and to develop the scale models to simulate real wildland fires. It was found that fire spreads are categorized into two types: the one mainly governed by radiation from flame and the other by convection of hot gases. The first type is often found in horizontal fires where the velocity of fire spread and the irradiance measured at geometrically similar points do not depend on the size. The latter type is found in up slope and wind driven fires, where both the velocity of fire spread and the irradiance become proportional to the square root of the length. Results of model experiments indicate the potential of the simulation for wildland fires. R.J.F.

N84-13369# Harvard Univ., Cambridge, Mass. Div. of Engineering and Applied Physics.
THE COMPUTER FIRE CODES AND REQUIRED NEW DATA
Howard W. Emmons *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 497-536 refs (For primary document see N84-13341 04-31)
(Grant NBS-G7-9011)
Avail: NTIS HC A99/MF A01

Preliminary efforts toward the development of computer fire codes are discussed. The Computer Fire Codes have reached the fifth version. Each version has replaced the previous one in both the fire phenomena included and the robustness of the numerical algorithms. Each of these programs are capable of computing a fire in only one room. A report on the documentation for CFC V(1) has been issued and a number of copies of the computer program tape have been sold at cost to various users. The computer fire code VI is being developed. Initially, it will contain the same physics as CFC V, but will have a revised structure which will permit greater flexibility in introducing new physics and new numerical techniques. The general arrangement is shown.
B.W.

N84-13370# Factory Mutual Research Corp., Norwood, Mass.
FIRE MODELING RESEARCH AT FACTORY MUTUAL **c25**
Raymond Friedman and John deRis *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 537-555 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

This review describes a research program that responds to the FMRC goal of developing validated modeling techniques for predicting the flammability and extinguishability of materials in their various industrial configurations. The program consolidates and generalizes proven modeling techniques addressed to specific aspects of this goal. Those results of recent work include: (1) a detailed computer model of the flow field and droplet trajectory induced by a sprinkler spray; (2) simple yet accurate formulas for burning rates of wall fires, enclosure fires, and intermediate scale pool fires; (3) a variety of instrumentation applicable to laboratory scale flammability measurements; (4) simplified calculations of radiant heat emission from soot combustion product mixtures in fires and fire behavior under a range of conditions, such as oxygen depletion due to entrainment of smoke. Author

N84-13371# California Univ., Berkeley. Dept. of Mechanical Engineering.
FLAME HEIGHTS, FLAME RADIATION AND FLAME SPREAD **c25**
Patrick J. Pagni *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 556-573 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

A brief summary of fire modeling research is presented. Flame height, flame radiation and flame spread are all discussed in detail. B.W.

N84-13372# National Bureau of Standards, Washington, D.C. Center for Fire Research.
RECENT PROGRESS AT NBS IN FIRE GROWTH MODELING c25
James Quintiere *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 574-596 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

This report will center on the activities at NBS, primarily, and will indicate program aspects and some results. The direction of the work is in refinements, checks, and application of single room codes, like harvard CFCV; emphasis on 'wind-aided' flame spread; the establishment of a data base for models; and extension of modeling concepts to consider multi-compartment fire spread.
Author

N84-13373# Tokyo Univ. (Japan). Engineering Research Inst.
RESPONSE OF FLAME SPREAD PHENOMENA TO AMBIENT AIR STREAM VELOCITY CHANGES c25
Toshisuke Hirano, Kenji Sato, and Hiroaki Minami *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 597-615 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The response of downward flame spread over a paper sheet to the velocity changes of an upward ambient air stream has been studied. The experiments were performed in a vertical duct mounted on a converging nozzle of a wind tunnel. When the free-stream velocity was instantaneously increased from that for stable flame spread to that above the stable flame-spread limit, two modes of extinction were observed. One was instantaneous extinction caused by the high air stream velocity near the leading flame edge, i.e., by the blow off of the flame, and the other was delayed extinction caused by the diminish of the pyrolysis zone, i.e., by the stop of the pyrolysis gas ejection sustaining the flame.
Author

N84-13374# National Bureau of Standards, Washington, D.C.
STUDY OF BIOLOGICAL SAMPLES OBTAINED FROM VICTIMS OF MGM GRAND HOTEL FIRE c52
M. Birky, D. Malek, D. Mayne, and M. Paabo *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 622-652 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

Sample treatment and analytical schemes used to examine blood samples and thawed lung tissues four months after the fire are described. Results of THb, COHb, MetHb and O2Hb tests are presented and compared with the initial values obtained immediately after the fire as well as with results obtained following a fire in Maryland. Approximately 47% of the MGM Grand Hotel fire victims had less than 50%- COHb saturation, a COHb level that was used as a criterion for lethality. Efforts to identify other toxic products through head space analysis on the lung tissue samples did not provide additional information on the toxic nature of the products; however, X ray fluorescence measurements in scraping taken from 2 bronchii samples showed that a compound containing bromine was an inhaled product. Findings of methylbromine in soot collected from filters in the air handling system, bromine in synthetics used in the interior materials in the casino, and bromine in soot taken from the respiratory tracts suggest that toxicants other than carbon monoxide could have contributed to the toxic nature of the fire.
A.R.H.

N84-13375# Building Research Inst., Tokyo (Japan).
US-JAPAN COOPERATIVE RESEARCH ON EVALUATION OF TOXICITY c52
Shuitsu Yusa, Fumiharu Saito, and Masashi Yoshida *In its* Proc. of the 6th Joint Panel Meeting 1982 p 655-663 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The sensitivity of toxicity in mice and rats from the combustion products of Douglas fir, acrylic carpet, and particle board was examined. Experiments conducted using the Japanese method yielded results which contradict those obtained from using the NBS method. The cause of this may be the difference in the process of forming the combustion product. Accordingly, the atmospheric oxygen condition for combustion may affect the formation of effluent products.
A.R.H.

N84-13376# Yokohama Municipal Univ. (Japan). Dept. of Legal Medicine.
PHYSIOLOGICAL FUNCTION OF COMBUSTION GAS AND ESPECIALLY THAT OF CN c52
Yoichi Nishimaru and Yukio Tsuda *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 664-669 (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

When cyanide is absorbed and enters the blood stream, functions of the oxiginate ferment are suppressed in internal organs and tissues cells; the oxygen in blood is prevented from being consumed. The CN immediately unites with ferments such as cytochrome and interferes with their functions. In examples of death due to cyanide poisoning, cyanide hemoglobin is sometimes detected but it is now thought the CNHb probably does not function as a blood poison. A minute quantity of CN causes stimulation of the central nervous system but paralysis occurs immediately after. The respiratory functions are most easily affected, then the vasomotor and convulsion centers. There is evidence that CN also causes myocardial infarction. Research is needed to determine how much of the damages done by CN, which is more poisonous than CO, is reversible.
A.R.H.

N84-13377# Fire Research Inst., Tokyo (Japan).
DEPENDENCE OF EVOLUTION OF TOXIC GASES ON BURNING CONDITIONS c25
Tokio Morikawa *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 670-682 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

Carbon monoxide, hydrogen chloride, hydrogen cyanide, acrolein, and formaldehyde are a few of the most significant toxicants in fire. The evolution of these products is described with respect to the air supply and temperature conditions.
A.R.H.

N84-13378# Building Research Inst., Tokyo (Japan).
PROPOSED PLAN FOR JOINT RESEARCH PROGRAM BETWEEN JAPAN, THE USA AND CANADA CONCERNING GAS TOXICITY IN FIRES
Fumiharu Saito *In its* Proc. of the 6th Joint Panel Meeting 1982 p 684-692 (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

Plans for developing a suitable method of evaluating fire gas toxicity in Japan as well as for improving the safety of materials require assistance from research systems in other countries. Tests conducted on a laboratory scale as well as full scale tests depend on the establishment of burning conditions, the development of combustion apparatus, an effective evaluation method, and agreement on what parameters are used to describe toxicity. Improvements needed in the combustion furnaces proposed by Canada, the NBS, and the Japanese Ministry of Construction are listed. The layout of a full scale fire test laboratory is included.
A.R.H.

N84-13379# Building Research Inst., Tokyo (Japan). Testing and Evaluation Dept.
ON SMOKE CONTROL EXPERIMENTS c25
Toshio Yamana *In its* Proc. of the 6th Joint Panel Meeting 1982 p 700-725 (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

The full scale fire test laboratory and an existing high-rise building were used to study the propagation properties of smoke and flow resistance (control effects). The results obtained were then compared with those of a computerized simulation in order to study the validity of the mathematical mode used. Pressure distribution and flow resistance in the stairway, the required rate of air supply, and the result of smoke discharge from the corridor and air supply to the vestible are shown in graphs as well as the

pattern of various smoke control methods, the flow rates, and the comparison of experiment values with the simulation values.
A.R.H.

N84-13380*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN APPLICATION OF NONLINEAR PROGRAMMING TO THE DESIGN OF REGULATORS OF A LINEAR-QUADRATIC FORMULATION Final Report
Peter Fleming Oct. 1983 27 p refs
(Contract NAS1-17070)
(NASA-CR-17253; NAS 1.26:17253) Avail: NTIS HC A03/MF A01 CSCL 13B

A design technique is proposed for linear regulators in which a feedback controller of fixed structure is chosen to minimize an integral quadratic objective function subject to the satisfaction of integral quadratic constraint functions. Application of a nonlinear programming algorithm to this mathematically tractable formulation results in an efficient and useful computer aided design tool. Particular attention is paid to computational efficiency and various recommendations are made. Two design examples illustrate the flexibility of the approach and highlight the special insight afforded to the designer. One concerns helicopter longitudinal dynamics and the other the flight dynamics of an aerodynamically unstable aircraft. M.G.

N84-13381# Royal Aircraft Establishment, Farnborough (England).
EXTRUSION. STATE OF THE ART AND DEVELOPMENT, REVIEW PAPER
M. Bauser and E. Tuschy Dec. 1982 28 p refs Transl. into ENGLISH from Z. Metalallkunde (West Germany), v. 73, no. 7, 1982 p 411-419
(RAE-Trans-2102; BR89770) Avail: NTIS HC A03/MF A01

Extrusion procedures are described that are in current use in industry for the production of rods, wires, sections, and tubes. Progress on the theory of extrusion of development of extrudable materials and of preventing specific extrusion defects is discussed. Microelectronics and improved sensors allow more effective production with consistent high quality. Trends in development of machines, tooling and procedures are outlined and problems of material and shaping technique development are discussed.
Author

N84-13382# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE, BIMONTHLY BULLETIN, NO. 1982-6, 211/NOVEMBER-DECEMBER 1982
Claude Sevestre, ed ESA Apr. 1983 76 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris) no. 1982-6, 211/Nov.-Dec. 1982 Individual titles previously announced as A83-31169 through A83-31174
(ESA-TT-801) Avail: NTIS HC A05/MF A01; HC English Available at ONERA, Paris FF 60; original report in FRENCH available at ONERA, Paris FF 60

A modular method for centrifugal compressor performance prediction is presented. Cyclic hardening of stainless steel under complex loading is described. Fatigue failure microinitiation, micropropegation and damage is considered. The stability of a tilting rotor aircraft model is studied. The thermal stability of titanium alloys is investigated. A compensator for thermal effects on quartz oscillators is described. ESA

N84-13383# Brookhaven National Lab., Upton, N. Y.
A HELIUM REFRIGERATOR WITH FEATURES FOR SUPERCRITICAL PRESSURE COOLING
K. C. Wu, D. P. Brown, A. P. Schlafke, and J. H. Sondericker 1983 8 p refs Presented at the Cryogenic Eng. Conf. and Intern. Cryogenic Mater. Conf., Colorado Springs, 15-19 Aug. 1983
(Contract DE-AC02-76CH-00016)
(DE84-017759; BNL-33592; CONF-830841-18) Avail: NTIS HC A02/MF A01

The cold end of the helium refrigerator with features for supercritical pressure cooling where it deviates from a conventional refrigerator is described. Two methods of transporting cooling from the load are considered. The first uses a cold circulating pump to circulate helium around the load. The second simply uses the J-T flow from the refrigerator to transport cooling. Measurements have been performed to verify refrigerator capacity. The refrigerator configuration is illustrated, and results of the capacity of the refrigerator and performance data for the ejector and the circulating pump are presented. Operating experience is discussed. DOE

N84-13384# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.
CONTROL AND OPERATION COST OPTIMIZATION OF THE HISS CRYOGENIC SYSTEM
J. Porter, F. Bieser, and D. Anderson Aug. 1983 12 p Presented at the Cryog. Eng. Conf. and Intern. Cryog. Mater. Conf., Colorado Springs, 15-19 Aug. 1983
(Contract DE-AC03-76SF-00098)
(DE83-017741; LBL-16505; CONF-830841-20) Avail: NTIS HC A02/MF A01

The Heavy Ion Spectrometer System (HISS) relies upon superconducting coils of cryostable design to provide a maximum particle bending field of 3 tesla. A previous paper describes the cryogenic facility including helium refrigeration and gas management. A control strategy which has allowed full time unattended operation, along with significant nitrogen and power cost reductions is discussed. Reduction of liquid nitrogen consumption was accomplished by using the sensible heat available in the cold exhaust gas. Measured nitrogen throughput agrees with calculations for sensible heat utilization of zero to 70%. Calculated consumption saving over this range is 40 liters per hour for conductive losses to the supports only. It is found that the measured throughput differential for the total system is higher. DOE

N84-13385# Brookhaven National Lab., Upton, N. Y.
COMBINED COLD COMPRESSOR/EJECTOR HELIUM-REFRIGERATOR CYCLE
A. P. Schlafke, D. P. Brown, and K. C. Wu 1983 6 p refs Presented at the Cryogenic Eng. Conf. and Intern. Cryogenic Mater. Conf., Colorado Springs, 15-19 Aug. 1983
(Contract DE-AC02-76CH-00016)
(DE83-017764; BNL-33593; CONF-830841-12) Avail: NTIS HC A02/MF A01

The feasibility of cold compressors as related to a large refrigerator was studied. It is shown that the use of a cold compressor in series with an ejector is an effective was to produce low pressure in a helium refrigeration system. The combined cold compressor and ejector system produces a lower temperature on the same load or more cooling at the same temperature than the system which uses only an ejector. DOE

N84-13386# Fermi National Accelerator Lab., Batavia, Ill.
FERMILAB SATELLITE REFRIGERATOR COMPRESSORS WITH THE OIL- AND MOISTURE-REMOVAL SYSTEMS
John A. Satti and Richard A. Andrews Aug. 1983 9 p Presented at the Cryogenic Eng. Conf. and Intern. Cryogenic Mater. Conf., Colorado Springs, 15-17 Aug. 1983
(Contract DE-AC02-76CH-03000)
(DE83-017328; FERMILAB/TM-1206; CONF-830841-7) Avail: NTIS HC A02/MF A01

A helium purification system for the energy doubler and the experimental areas was tested. A purification system is installed after each screw compressor in the satellite refrigerators. The purification system removes oil mist, oil vapor, water vapor, and particulate from the compressed helium. The units were designed with consideration of modularity and necessary redundancy. Test results and achieved performance of the oil removal in the operating system are presented. DOE

N84-13387# Los Alamos Scientific Lab., N. Mex.
ELECTRICAL AND THERMAL MODELING OF RAILGUNS
J. F. Kerrisk 1983 5 p refs Presented at the 2nd Symp. on Electromagnetic Launch Technol., Boston, 10-14 Oct. 1983

(Contract W-7405-eng-36)
(DE84-001361; LA-UR-83-2579) Avail: NTIS HC A02/MF A01

Electrical and thermal modeling of railguns was accomplished to obtain detailed information about the behavior of specific railgun components such as the rails, and to predict overall performance of railgun tests. Emphasis was on calculations of the inductance and surface current distribution of long parallel conductors in the high-frequency limit and on calculations of current and thermal diffusion in rails. Inductance was calculated for various rail cross sections and for magnetic flux compression generators. Inductance and current distribution results were compared with experimental measurements. Two dimensional calculations of current and thermal diffusion in rail cross sections and predictions of rail heating and melting as a function of rail size and total current are discussed. An overall performance model of a railgun and power supply was developed and used to design tests. The lumped-parameter circuit model uses results from the detailed inductance and current diffusion calculations along with other circuit component models to predict rail current and projectile acceleration, velocity, and position as a function of time. DOE

N84-13388# Rensselaer Polytechnic Inst., Troy, N. Y.
PHYSICAL MODELING OF THE CHAMPAGNE EFFECT
P. A. Thompson, H. J. Sneck, B. Hand, B. Meyer, C. Ping, and E. Roehl Sep. 1983 97 p refs Prepared for Pacific Northwest Lab., Richland, Wash.
(Contract DE-AC06-76RL-01830)
(DE84-001813; PNL-4623) Avail: NTIS HC A05/MF A01

A particularly important concern is the champagne effect, a hydraulic process with the potential to cause a loss of storage cavern pressure or even blowout of the cavern. Under subcontract to the Pacific Northwest Laboratory, researchers at Rensselaer Polytechnic Institute conducted an investigation to determine the factors that influence bubble formation in a CAES cavern. Using this information, they then undertook to develop a model to predict the effect of those bubbles on the discharge of water from a CAES cavern. This research project involved parallel analytical and experimental efforts. Two physical models were developed, one relatively simple and analytical, the other much more detailed and numerical. A high-solubility carbon dioxide/water laboratory model of a CAES system was also constructed. Results obtained from bubble formation experiments using the laboratory-scale CAES facility were compared with those generated by the predictive models. The high-solubility CO2/H2O champagne effect laboratory model successfully simulated the behavior of a CAES system. DOE

N84-13389# Texas Univ., Austin. Center for Transportation Research.
DETECTION OF CRACKS ON HIGHWAY PAVEMENTS Interim Report
C. H. Chien, W. N. Martin, A. H. Meyer, and J. K. Aggarwal May 1983 66 p refs Sponsored in cooperation with Texas State Dept. of Highways and Public Transportation and Federal Highway Administration
(PB83-238204; CTR-3-8-80-256-3; FHWA/TX-83/7) Avail: NTIS HC A04/MF A01 CSCL 13B

In a maintenance management program for continuously reinforced concrete pavement (CRCP), it is desirable to determine the rate of change of the crack spacing. When the crack spacing becomes smaller, than the designed spacing there is a potential for failure and therefore preventive maintenance may be considered. Since field measurement of crack spacing of highway pavements is impractical in areas with high traffic densities, image processing techniques using aerial photographs have been explored as a means for automating this process. Algorithms for detection of cracks of highway pavements in aerial photographs are presented in this report. In an aerial photograph of the pavement, edge points are identified and potential boundaries of water marks are labelled. Author (GRA)

N84-13390# National Bureau of Standards, Washington, D.C. National Engineering Lab.
LATERAL-TORSIONAL RESPONSE OF STRUCTURES SUBJECTED TO SEISMIC WAVES
Spencer T. Wu and Edgar V. Leyendecker Jun. 1983 32 p refs
(PB83-239582; NBSIR-83-2727) Avail: NTIS HC A03/MF A01 CSCL 13M

The behavior of coupled lateral torsional systems subjected to seismic waves is investigated analytically. The report presents the numerical results of a parametric study for structures subjected to S-H waves. Case studies are provided to show the contribution of each of the selected parameters to the rotational response of the systems. These parameters are: geometric eccentricity, aspect ratio of the foundation mat, damping ratio, and the ratio of the rotational to translational frequencies. Dynamic eccentricity is selected as an index to represent the level of the response. The sensitivity due to the deviation of the input spectrum is investigated. Accidental eccentricities due to seismic waves are also evaluated. Design concerns are given on how the design eccentricity should be considered based on this study. Author (GRA)

N84-13391# Earthquake Engineering Research Inst., Berkeley, Calif.
GENERALIZED PLASTIC HINGE CONCEPTS FOR 3D BEAM-COLUMN ELEMENTS
Paul Fu-Song Chen and Graham H. Powell Nov. 1982 277 p refs Sponsored in part by California Univ., Lawrence Livermore Lab.
(Grant NSF CEE-81-05790)
(PB83-247981; UCB/EERC/82/20; NSF/CEE-82062) Avail: NTIS HC A13/MF A01 CSCL 13M

In the section type of model, inelastic behavior is defined for the cross section as a whole, rather than for individual fibers. Action deformation relationships for the cross section must be devised, considering the stress-strain characteristics of the cross section material. Models of this type are less accurate than fiber models, but more efficient computationally. This report presents the theory and computational techniques for the section type of model and analyzes five example structures. In developing the model, inelastic interaction between bending moments, torque and axial force has been considered by means of yield interaction surfaces and a flow rule type of plasticity theory. Emphasis has been placed on the ability to consider arbitrary loading-unloading cycles of the type likely to be induced by an earthquake. Author (GRA)

N84-13392# Michigan Univ., Ann Arbor. Dept. of Industrial and Operations Engineering.
SLIPPERY VERSUS SLIP RESISTANT WORK SURFACES: THE BACKGROUND FOR A REGULATORY DEFINITION Final Report
James M. Miller Feb. 1983 34 p refs Sponsored in part by Occupational Safety and Health Administration
(PB83-243634; IOE/CE-83-02) Avail: NTIS HC A03/MF A01 CSCL 13L

There has been over fifty years of scattered research into the areas of walking/working surface slipperiness and coefficient of friction (COF) measurement. In spite of this research, numerous standards address slip/fall type accidents only in terms of requiring surfaces to be qualitatively useful in providing guidelines for establishing quantitative criteria for 'slippery' vs. 'slip resistant' combinations of surface, shoe, task, and contaminant conditions. Recommendations applicable to standards making organizations are made. Among them are: (1) changing legally inappropriate descriptor terms such as 'nonslip' to 'slip resistant'; and (2) defining 'slippery' vs. 'slip resistant' in terms of quantitative COF values (i.e., for persons walking unloaded on level surfaces a COF of 0.5 would be a reasonable standard). Author (GRA)

N84-13393# Earthquake Engineering Research Inst., Berkeley, Calif.
EARTHQUAKE RESPONSE CONSIDERATIONS OF BROAD LIQUID STORAGE TANKS
Frank J. Cambra Nov. 1982 197 p refs
(PB83-251215; UCB/EERC-82/25) Avail: NTIS

HC A09/MF A01 CSCL 13D

The influences of tank geometry and foundation stiffness variation on the simulated seismic structural response of a model broad tank are discussed. An empirical method for describing tank bottom plate uplift geometry is proposed which recognizes radial catenary force and foundation stiffness. Axial symmetric lift, static tilt and dynamic shaking table tests were performed in the University of California, Berkeley, earthquake simulator laboratory. A structural geometric survey of a 63 ft - 10 inches tall by 289 ft - 6 inches diameter crude oil storage tank was conducted to establish a comparative base by which to evaluate the model tank eccentricities. GRA

N84-13394# Hawaii Univ., Manoa. Water Resources Research Center.

STREAM-WATER STORAGE IN THE OCEAN USING AN IMPERMEABLE MEMBRANE

Edwin T. Murabayashi, Michael Asuka, Russell Yamada, Yu-Si Fok, and Henry K. Gee May 1983 72 p refs

(Contracts DI-14-34-0001-9262; DI-1434-0001-2113)

(PB83-248369; TR-152; W83-03772; OWRT-B-065-HI(1)) Avail: NTIS HC A04/MF A01 CSCL 13B

The conceptual feasibility of storing fresh water in the ocean was investigated using a plastic membrane as the reservoir liner. In the initial phase, two physical hydraulic models were constructed to test the concept. The first was a water-filled, glass-sided box to observe the movement and reaction of the membrane to various simulated effects of currents, waves, and sediment deposition. The second was a 1:400-scale model (6.7 x 6.1 m) of West Loch, Pearl Harbor (a potential field application site), with 1:24 vertical exaggeration for similitude. The curtain method was used because it can enclose a large water body. The effect of wind, waves, tides, and currents on the curtain were simulated and the reactions observed. Although modeling is a useful tool for investigating initial concepts, its direct field application is limited because of scaling. Curtains, floating reservoirs, and bags were constructed of polyethylene sheets and deployed. All worked well after modifications were made following initial testing. Author (GRA)

N84-13395# National Bureau of Standards, Washington, D.C. National Engineering Lab.

PROGRAMMER'S MANUAL FOR THE FIRE SAFETY EVALUATION SYSTEM COST MINIMIZER COMPUTER PROGRAM

Robert E. Chapman and William G. Hall Jul. 1983 100 p refs Sponsored in part by Dept. of Health and Human Services

(PB83-251447; NBSIR-83-2749) Avail: NTIS HC A05/MF A01 CSCL 13M

The fire safety evaluation system cost minimizer (FSESCM) computer program integrates engineering and economic considerations with a linear programming algorithm which permits the least-cost means of upgrading health care facilities to compliance with the Life Safety Code to be identified. A mathematical discussion of the application program is used to introduce the basic philosophy behind the FORTRAN program. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N84-13396 British Broadcasting Corp., London (England). Engineering Div.

OPTICAL METHODS OF MEASURING LOUDSPEAKER DIAPHRAGM MOVEMENT

E. W. Taylor and C. D. Mathers Nov. 1983 17 p refs

(BBC-RD-1983/13) Avail: BBC, Kingswood Warren, Radworth, Surrey, Engl.

The principles of making measurements of the vibrational behavior of lightweight diaphragms, using optical methods employing coherent light interferometric techniques, are discussed. The use of a frequency shifted reference beam (Doppler interferometry) is described, and simple methods of obtaining such a reference beam are considered. Results of measurements made on the diaphragms of loud speaker drive units are discussed and methods of presenting these results are outlined. Author

N84-13397*# National Aeronautics and Space Administration, Washington, D. C. Dept. of Electrical Engineering.

PROPAGATION EFFECTS ON SATELLITE SYSTEMS AT FREQUENCIES BELOW 10 GHz, A HANDBOOK FOR SATELLITE SYSTEMS DESIGN, 1ST EDITION

Warren L. Flock Dec. 1983 433 p refs

(Contracts NAS7-100; JPL-956249)

(NASA-RP-1108; NAS 1.61:1108) Avail: NTIS HC A19/MF A01 CSCL 20N

Satellite communications below about 6 GHz may need to contend with ionospheric effects, including Faraday rotation and ionospheric scintillation, which become increasingly significant with decreasing frequency. Scintillation is most serious in equatorial, auroral, and polar latitudes; even the 4 to 6 GHz frequency range turns out to be subject to scintillation to a significant degree of equatorial latitudes. Faraday rotation, excess range or time delay, phase advance, Doppler frequency fluctuations, and dispersion are proportional to total electron content (TEC) or its variation along the path. Tropospheric refraction and fading affects low angle satellite transmissions as well as terrestrial paths. Attenuation and depolarization due to rain become less important with decreasing frequency but need consideration for frequencies of about 4 GHz and higher. Empirically derived relations are useful for estimating the attenuation expected due to rain for particular percentages of time. Aeronautical, maritime, and land mobile satellite services are subject to fading due to multipath propagation. Author

N84-13398*# LNR Communications, Inc., Hauppauge, N. Y.

THE 30 GHz COMMUNICATIONS SATELLITE LOW NOISE RECEIVER Final Report

L. J. Steffek and D. W. Smith Oct. 1983 67 p

(Contract NAS3-22494)

(NASA-CR-168254; NAS 1.26:168254; LNR-400) Avail: NTIS HC A04/MF A01 CSCL 17B

A Ka-band low noise front end in proof of concept (POC) model form for ultimate spaceborne communications receiver deployment was developed. The low noise receiver consists of a 27.5 to 30.0 GHz image enhanced mixer integrated with a 3.7 to 6.2 GHz FET low noise IF amplifier and driven by a self contained 23.8 GHz phase locked local oscillator source. The measured level of receiver performance over the 27.3 to 30.0 GHz RF/3.7 to 6.2 GHz IF band includes 5.5 to 6.5 dB (typ) SSB noise figure, 20.5 + or - 1.5 dB conversion gain and +23 dBm minimum third order two tone intermodulation output intercept point. M.G.

N84-13399*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

MICROWAVE MONOLITHIC INTEGRATED CIRCUIT DEVELOPMENT FOR FUTURE SPACEBORNE PHASED ARRAY ANTENNAS

G. Anzic, T. J. Kascak, A. N. Downey, D. C. Liu, and D. J. Connolly Dec. 1983 20 p refs To be presented at the 10th Ann. Commun. Satellite System Conf., Orlando, Fla., 18-22 Mar. 1984

(NASA-TM-83518; NAS 1.15:83518; E-1867) Avail: NTIS HC A02/MF A01 CSCL 17B

The development of fully monolithic gallium arsenide (GaAs) receive and transmit modules suitable for phased array antenna applications in the 30/20 gigahertz bands is presented. Specifications and various design approaches to achieve the design goals are described. Initial design and performance of submodules and associated active and passive components are presented. A tradeoff study summary is presented highlighting the advantages of distributed amplifier approach compared to the conventional single power source designs. Author

N84-13400*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A SYSTEM FOR THE SIMULATION AND EVALUATION OF SATELLITE COMMUNICATION NETWORKS
James W. Bagwell Dec. 1983 15 p refs To be presented at the 10th Commun. Satellite Systems Conf., Orlando, Fla., 18-22 Mar. 1984
(NASA-TM-83531; NAS 1.15:83531; E-1897) Avail: NTIS HC A02/MF A01 CSCL 17B

With the emergence of a new era in satellite communications brought about by NASA's thrust into the Ka band with multibeam and onboard processing technologies, new and innovative techniques for evaluating these concepts and systems are required. To this end, NASA, in conjunction with its extensive program for advanced communications technology development, has undertaken to develop a concept for the simulation and evaluation of a complete communications network. Incorporated in this network will be proof of concept models of the latest technologies proposed for future satellite communications systems. These include low noise receivers, matrix switches, baseband processors, and solid state and tube type high power amplifiers. To accomplish this, numerous supporting technologies must be added to those aforementioned proof of concept models. These include controllers for synchronization, order wire, and resource allocation, gain compensation, signal leveling, power augmentation, and rain fade and range delay simulation. Taken together, these will be assembled to comprise a system capable of addressing numerous design and performance questions. The simulation and evaluation system as planned will be modular in design and implementation, capable of modification and updating to track and evaluate a continuum emerging concepts and technologies. Author

N84-13401*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE TELECOMMUNICATIONS AND DATA ACQUISITION REPORT Progress Report, Jul. - Sep. 1983
E. C. Posner, ed. 15 Nov. 1983 151 p refs
(NASA-CR-174610; JPL-TDA-PR-42-75; NAS 1.26:174610) Avail: NTIS HC A08/MF A01 CSCL 17B

Developments in programs in telecommunication and data acquisition in space communications, radio navigation, radio science, and ground based radio astronomy are reported. Activities of the deep space network (DSN) and its associated ground communication facility (GCF) in planning, supporting research and technology, implementation, and in operations are outlined. The publication of reports on the application of radio interferometry at microwave frequencies for geodynamic measurements are presented. Implementation and operation for searching the microwave spectrum is reported. For individual titles, see N84-13402 through N84-13416.

N84-13402*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ORBIT DETERMINATION OF HIGHLY ELLIPTICAL EARTH ORBITERS USING VLBI AND DELTA VLBI MEASUREMENTS c13
R. B. Frauenholz and J. Ellis *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 1-13 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 22A

The feasibility of using very long baseline interferometric (VLBI) data acquired by the deep space network to navigate highly elliptical Earth orbiting satellites was shown. The navigation accuracy improvements achievable with VLBI and delta VLBI data types are determined for comparison with the Doppler capability. The sensitivity of the VLBI navigation accuracy to the baseline orientation relative to the orbit plane and the effects of major error sources such as gravitational harmonics and atmospheric are examined. It is found that VLBI measurements perform as well as strategies using conventional Doppler, while substantially reducing the required antenna support. E.A.K.

N84-13403*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE EFFECTS OF REED-SOLOMON CODE SHORTENING ON THE PERFORMANCE OF CODED TELEMETRY SYSTEMS c17
L. J. Deutsch *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 14-20 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 09F

The theory of Reed-Solomon code shortening in general was developed and the degradation due to shortening in the context of concatenated coding was qualified. It is shown that in the NASA/ESA concatenated system, significant degradations occur only when $N < 180$. A Reed-Solomon code was concatenated with an inner (7, 1/2) convolutional code. Under some circumstances, it would be desirable to use a shorter outer code word length. For example, the format of the data coming from science instruments on board a spacecraft may lend itself naturally to a word length of 200 symbols rather than 223. To accommodate such code word lengths, the Reed-Solomon code can be shortened to an (N, N-32) code where N can be any integer between 33 and 255. Shortening the code, however, changes its performance. On one hand, the amount of redundancy per information symbol increases. Because of this increased redundancy, the amount of energy per information symbol is decreased by code shortening. The overall effect is to degrade the performance of the code. E.A.K.

N84-13404*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DETECTORS FOR OPTICAL COMMUNICATIONS: A REVIEW
J. Katz *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 21-38 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 17B

Detectors for optical communications in the visible and near infrared regions of the spectrum are reviewed. The three generic types of detectors described are: photomultipliers, photodiodes and avalanche photodiodes. Most of the information is applicable to other optical communications systems. E.A.K.

N84-13405*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SUPERCONDUCTING NIOBIUM THIN FILM SLOW-WAVE STRUCTURES c76
J. J. Bautista, S. M. Petty, L. H. Allen (Stanford Univ.), M. R. Beasley (Stanford Univ.), and R. H. Hammond (Stanford Univ.) *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 39-51 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 20L

A superconducting comb structure as a slow-wave element in a traveling-wave maser will significantly improve maser noise temperature and gain by reducing the insertion loss. The results of the insertion loss measurements of superconducting niobium slow-wave structures subjected to maser operating conditions at X-Band frequencies are presented. Author

N84-13406*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VLSI ARCHITECTURES FOR COMPUTING MULTIPLICATIONS AND INVERSES IN GF(2-m) c64
C. C. Wang, T. K. Truong, H. M. Shao, L. J. Deutsch, J. K. Omura (California Univ., Los Angeles), and I. S. Reed (Univ. of Southern California) *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 52-64 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 12A

Finite field arithmetic logic is central in the implementation of Reed-Solomon coders and in some cryptographic algorithms. There is a need for good multiplication and inversion algorithms that are easily realized on VLSI chips. Massey and Omura recently developed a new multiplication algorithm for Galois fields based on a normal basis representation. A pipeline structure is developed to realize the Massey-Omura multiplier in the finite field GF(2m). With the simple squaring property of the normal-basis representa-

tion used together with this multiplier, a pipeline architecture is also developed for computing inverse elements in GF(2m). The designs developed for the Massey-Omura multiplier and the computation of inverse elements are regular, simple, expandable and, therefore, naturally suitable for VLSI implementation. Author

N84-13407*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DEFORMABLE SUBREFLECTOR COMPUTED BY GEOMETRIC OPTICS c74
M. S. Katow, I. Khan, and W. F. Williams *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 65-78 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 20F

Using a Cassegrainian geometry, the 64-meter antenna with its distorted paraboloidal reflecting surface is forced to produce a uniform phase wavefront by a pathlength-compensating subreflector. First, the computed distortion vectors at the joints or nodes of the main reflector structure supporting the surface panels are best fitted to a paraboloid. Second, the resulting residual distortion errors are used to determine a compensating subreflector surface by ray tracing using geometric optics principles. Third, the totally corrected subreflector surface is defined by the normal directions and distances to the surface of the original symmetric hyperboloid for the purpose of evaluation. Finally, contour maps of distortions of the paraboloid reflector and the compensating subreflector are presented. A field-measured check of the subreflector in focused position as computed by the described methodology is also presented for the antenna position at horizon look with the geometry at 45 degrees elevation. Author

N84-13408*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN EPROM-BASED FUNCTION GENERATOR c33
L. Fowler and J. A. McNeil *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 79-83 (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 09C

A circuit is described to produce arbitrary time-dependent voltage functions derived from digital information stored in EPROMs. While this circuit is designed to be used as a modulator of the microwave pump source or a solid state low noise maser, it can be readily adapted for other applications. Author

N84-13409*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
POLYNOMIAL DRIVEN TIME BASE AND PN GENERATOR c33
S. S. Brokl *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 84-90 ref (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 09C

In support of the planetary radar upgrade new hardware was designed to increase resolution and take advantage of new technology. Included is a description of the Polynomial Driven Time Base and PN Generator which is used for range gate coding in the planetary radar system. Author

N84-13410*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RF PERFORMANCE OF A PROPOSED L-BAND ANTENNA SYSTEM
J. R. Withington, H. F. Reilly, Jr., and D. A. Bathker *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 91-97 (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 20N

Scale model work to determine efficiencies and bandwidth were made on a smooth wall dual mode feedhorn to study the feasibility of its use at L-Band for the Venus Balloon Project. Measured feedhorn patterns were made and scattered from a symmetrical subreflector. A perturbation technique was then used to predict efficiencies due to scanning effects. A correction for the asymmetrical subreflector was also made. Tables of results and patterns are included. Author

N84-13411*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
INTERCONTINENTAL TIME AND FREQUENCY TRANSFER USING A GLOBAL POSITIONING SYSTEM TIMING RECEIVER c35
P. A. Clements *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 98-104 ref (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 14B

The DSN has a requirement to maintain knowledge of the frequency offset between DSN stations with 3 x 10 to the minus 13th power and time offset within 10 microseconds. It is further anticipated that in the 1987-1990 era the requirement for knowledge of time offset between DSN stations will be less than 10 nanoseconds. JPL is using the Global Positioning System (GPS) Space Vehicles, as a development project, to transfer time and frequency over intercontinental distances between stations of the DSN and between the DSN and other agencies. JPL has installed GPS timing receivers at its tracking station near Barstow, California, and at its tracking station near Madrid, Spain. The details of the experiment and the data are reported. There is a discussion of the ultimate capabilities of these techniques for meeting the functional requirements of the DSN. Author

N84-13412*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NASTRAN STRUCTURAL MODEL FOR THE LARGE 64-METER ANTENNA PEDESTAL. PART 2: IMPROVED MODEL c39
C. T. Chian *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 105-113 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 20K

Static analysis and a computer structural model for the large 64-m antenna pedestal are developed using the MSC version of the NASTRAN program. This improved pedestal model includes the launch areas and the actual pressure pattern of the oil under the hydrostatic bearing pad. The results obtained from the new improved model have indicated that the deflections due to pad loads are in good agreement with field measurements. The top surface deflection of the pedestal obtained from the NASTRAN model is used as an input to the oil film computer program to determine the minimum oil film thickness under the pad. Author

N84-13413*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ENERGY CONSUMPTION ANALYSIS OF THE VENUS DEEP SPACE STATION (DSS-13) c18
N. V. Hayes *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 114-123 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 22B

This report continues the energy consumption analysis and verification study of the tracking stations of the Goldstone Deep Space Communications Complex, and presents an audit of the Venus Deep Space Station (DSS 13). Due to the non-continuous radioastronomy research and development operations at the station, estimations of energy usage were employed in the energy consumption simulation of both the 9-meter and 26-meter antenna buildings. A 17.9% decrease in station energy consumption was experienced over the 1979-1981 years under study. A comparison of the ECP computer simulations and the station's main watt-hour meter readings showed good agreement. Author

N84-13414*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A STUDY OF THE CHARGED PARTICLE CALIBRATION REQUIREMENTS FOR THE DEEP SPACE NETWORK c46
S. A. Townes *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 124-131 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 04A

A study made of the Deep Space Network charged particle calibration requirements is discussed. The effects of charged

particles on navigation and timing systems were reviewed and it was proposed that a system based upon the Global Positioning System satellites be used to measure the charged particle content of the ionosphere. The system would be required to measure the total electron content of the ionosphere to the order of 10 to the 16th power electron per square meter. Two types of systems were suggested as possible candidates for making these measurements. R.J.F.

N84-13415*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DESIGN ISSUES IN THE GCF MARK 4 DEVELOPMENT
R. A. Crowe *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 132-139 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 17B

Some of the major design problems facing the computer based Ground Communications Facility (GCF) Digital Communication System for the Mark 4 Network Consolidation Program are discussed. The solutions to each as implemented in the software of the GCF Operation Programs are proposed. R.J.F.

N84-13416*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RESULTS OF THE AUSTRALIAN GEODETIC VLBI EXPERIMENT c43
B. R. Harvey (New South Wales Univ., Kensington, Australia), A. Stolz (New South Wales, Kensington, Australia), D. L. Jauncey (CSIRO, Epping, Australia), A. Niell, D. Morabito, and R. Preston *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 140-146 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 08B

The 250-2500 km baseline vectors between radio telescopes located at Tidbinbilla (DSS43) near Canberra, Parkes, Fleurs (X3) near Sydney, Hobart and Alice Springs were determined from radio interferometric observations of extragalactic sources. The observations were made during two 24-hour sessions on 26 April and 3 May 1982, and one 12-hour night-time session on 28 April 1982. The 275 km Tidbinbilla - Parkes baseline was measured with an accuracy of plus or minus 6 cm. The remaining baselines were measured with accuracies ranging from 15 cm to 6 m. The higher accuracies were achieved for the better instrumented sites of Tidbinbilla, Parkes and Fleurs. The data reduction technique and results of the experiment are discussed. R.J.F.

N84-13417# Pennsylvania State Univ., University Park. Dept. of Electrical Engineering.
WHITE LIGHT SIGNAL PROCESSING WITH THE APPLICATION TO SPREAD SPECTRUM COMMUNICATIONS Final Technical Report
Francis T. S. Yu Jun. 1983 106 p
(Contract F19628-81-K-0038; AF Proj. LD16)
(AD-A132418; RADC-TR-83-119) Avail: NTIS HC A06/MF A01 CSCL 20/6

Spread spectrum communication requires several operational processes. First, the informational signal should be encoded by some pseudorandom code into a broad bandwidth signal (e.g., frequency hopping). The transmitted signal should have the capability of anti-jamming or interference during the transmission. Second, the transmitted signal, which is at high bandwidth, must be decoded at the receiving end to give rise to the low bandwidth informational signal. The decoding process requires a synchronous psuedorandom reference code. Third, the informational signal may or may not be error correction coded and hence requires an appropriate decoding process. In this study the author investigates the utilization of a white-light or incoherence optical correlator for the signal decoding. GRA

N84-13418# Harvard Univ., Cambridge, Mass.
FIELDS AND CURRENTS AND CHARGES ON OBSTACLES IN A PARALLEL-PLATE SIMULATOR AT SELECTED FREQUENCIES AND WITH PULSE EXCITATION Final Report, 2 Feb. 1981 - 1 May 1983
T. T. Wu, M. Krook, R. W. P. King, H. M. Shen, R. Bansal, and M. Owens Kirtland AFB, N. Mex. AFWL Aug. 1983 56 p
(Contract F29601-81-K-0010; AF Proj. 3763)
(AD-A132406; AFWL-TR-83-45) Avail: NTIS HC A04/MF A01 CSCL 20/14

This final report summarizes the results of a 2-year study performed at Harvard University to determine the properties of the Harvard model simulator at selected frequencies and under pulse excitation. The continuous-wave (CW) study is completed with measurements at intermediate frequencies; a novel series apron device is developed to improve the performance in this frequency range. The pulse study begins with a theoretical and experimental investigation of the simpler rhombic simulator, and concludes with an investigation of the Harvard parallel-plate simulator. Both the rhombic and the metal-plate simulators exhibit unexpected complications which require further study. Each feature is examined individually and the sources of the many parasitic pulses are determined. Methods for eliminating the undesired pulses are presented, along with a new experimental technique to reduce the systematic interference and a new theory to solve for the current in the time domain. Author (GRA)

N84-13419# Michigan Univ., Ann Arbor. Dept. of Geological Sciences.
REFLECTION AND IDENTIFICATION STUDIES APPLIED TO TERRAIN IMAGING RADAR Contract Report, 11 Jun. 1982 - 11 Jun. 1983
Philip L. Jackson 30 Jun. 1983 85 p
(Contract DAAK70-82-C-0100)
(AD-A132401; ETL-0331) Avail: NTIS HC A05/MF A01 CSCL 17/9

Two separate studies were undertaken. The first was concerned with the slope effects on backscatter of synthetic aperture radar (SAR). The imagery of a cinder cone (SP Mountain in northern Arizona), which has near-homogeneous surface roughness, was studied. The flight parameters of the imaging radar vehicle were found from the radar image and topographic data obtained from a 1:62500 map. The slant range radar image was converted to ground range with relief displacement rectified. The three dimensional angle of incidence for each element was computed and plotted against the backscatter value. The average backscatter curve was a typical S-shaped pattern. With the techniques developed for the above, pseudo-SAR slant and ground range images were generated from the topographic data. The second study was concerned with investigating discrimination techniques for uncultivated, agricultural, suburban and urban areas. The work was limited to the use of the Fourier transform. Optical transforms and Fast Fourier transforms were obtained of optically processed SAR imagery. This preliminary work showed distinct differences between uncultivated and cultural areas, but not between cultural areas.
Author (GRA)

N84-13420# Naval Research Lab., Washington, D. C.
ALGORITHMS FOR SINGLE-SIGNAL AND MULTISIGNAL MINIMUM-CROSS-ENTROPY SPECTRUM ANALYSIS Interim Report
Rodney W. Johnson 3 Aug. 1983 37 p
(RR0210542)
(AD-A132400; AD-E000542; NRL-8667) Avail: NTIS HC A03/MF A01 CSCL 17/2

Two algorithms are presented that implement multisignal minimum cross entropy spectral analysis (MCESA), a method for estimating the power spectrum of one or more independent signals when a prior estimate for each is available and new information is obtained in the form of values of the autocorrelation function of their sum. Single signal MCESA is included as a special case. One of the algorithms is slow, but general: the prior spectrum estimates and the resulting (posterior) spectrum estimates are represented by discrete frequency approximations with arbitrarily spaced frequencies, and the autocorrelation values may be given at arbitrarily spaced lags. The other algorithm is considerably faster and applies to an important special case: the prior and posterior spectrum estimates are of the all pole form that results from

maximum entropy (or linear predictive) spectral analysis, and the autocorrelation values are given at equispaced lags beginning at zero. GRA

N84-13421# Lincoln Lab., Mass. Inst. of Tech., Lexington.
WIDEBAND INTEGRATED VOICE/DATA TECHNOLOGY Semiannual Technical Summary, 1 Oct. 1982 - 31 Mar. 1983
Clifford J. Weinstein and Peter E. Blankenship 31 Mar. 1983 43 p
(Contract F19628-80-C-0002; ARPA Order 3673; AF Proj. 3T10) (AD-A132284; ESD-TR-83-027) Avail: NTIS HC A03/MF A01 CSCL 17/2

An important challenge in the design of future military communications networks is to achieve overall system economy and adaptability through efficient and flexible allocation of common network resources to voice and data users. The major objective of the Wideband Integrated Voice/Data Technology Program is to address this challenge through the development of techniques for integrated voice and data communications in digital packet networks which include wideband common user satellite links. This report covers work in the following areas: development of a generalized compact vocoder based on digital LSI technology; development of Packet Voice Terminal (PVT) and local access network (LEXNET) facilities for experiments in packet voice; development and experimental application of a flexible internet stream gateway (the miniconcentrator) for packet voice; coordination and execution of multi-user packet speech experiments on the experimental wideband satellite network (WB SATNET); and development and experimental testing of a Voice-Controlled Operator (VCOP). GRA

N84-13422# Lincoln Lab., Mass. Inst. of Tech., Lexington.
APPLICATION OF PSEUDOINVERSION TO LINEAR SYSTEM IDENTIFICATION WITH DISCRETE MEASUREMENTS
Chaw-Bing Chang and Richard B. Holmes 15 Jul. 1983 55 p
(Contract F19628-80-C-0002)
(AD-A132283; TR-629; ESD-TR-83-038) Avail: NTIS HC A04/MF A01 CSCL 09/4

Formulas for the pseudoinverse of a compact operator are applied to linear system identification and scattering function estimation from a finite set of noisy measurements. The results is a nonparametric estimator possessing several desirable features. The approach encompasses the Modified Discrete Fourier Transform and is applied herein to the important problem of closely object resolution in radar/optical signal processing. Author (GRA)

N84-13423# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
ASYMPTOTIC OPTIMALITY OF SHORTEST PATH ROUTING
Eli M. Gafni and Dimitri P. Pertsekas Jul. 1983 33 p
(Contract N00014-75-C-1183; ARPA Order 3045)
(AD-A132280; LIDS-P-1307) Avail: NTIS HC A03/MF A01 CSCL 17/2

Many communication networks use adaptive shortest path routing. By this the authors mean that each network link is periodically assigned a length that depends on its congestion level during the preceding period, and all traffic generated between length updates is routed along a shortest path corresponding to the latest link lengths. It is shown that in certain situations, typical of networks involving a large number of small users and utilizing virtual circuits, this routing method performs optimally in an asymptotic sense. In other cases shortest path routing can be far from optimal. Author (GRA)

N84-13424# Rome Air Development Center, Hanscom AFB, Mass.
NULLING WITH LIMITED DEGREES OF FREEDOM
Randy L. Haupt Apr. 1983 44 p
(AF Proj. 4600)
(AD-A132276; RADC-TR-83-114) Avail: NTIS HC A03/MF A01 CSCL 20/14

A partial adaptive array is a more feasible alternative to the fully adaptive array when the number of array elements becomes very large. Three possible methods of implementing partial nulling are to place the adaptive controls at (1) selected elements in the aperture, (2) the subarray outputs, or (3) the feed of a space fed array. Of these choices, the first produces much less distortion to the antenna's far field pattern than the other two. This report analyzes the distortions due to nulling with limited degrees of freedom. Author (GRA)

N84-13425# Defence Research Establishment Valcartier (Quebec).
SPATIAL FILTERING FOR ENHANCING POINT TARGETS IN IMAGES FROM A SPACE-BASED MOSAIC IR DETECTOR
J. F. Boulter Jul. 1983 44 p
(AD-A132248; DREV-4287/83) Avail: NTIS HC A03/MF A01 CSCL 17/5

We examine by simulation the use of spatial filtering for enhancing the visibility of point targets and reducing the background clutter in imagery obtained with a space-based staring mosaic IR detector array. An experimental digital image-processing system was employed to interactively process LANDSAT 2 images containing simulated point targets. First, we obtained improved target detection and clutter rejection by using filters that produced considerably more high-frequency enhancement than the conventional Wiener filter. Second, convolution filters with large-area point-spread functions (e.g., those with 11 by 11 elements or those implemented with a 2 dimensional FFT algorithm) were more effective at attenuating the edges of extended regions of clutter (e.g., those corresponding to clouds, bodies of water, etc.) than were those with small areas (e.g., 3 by 3 or 5 by 5 elements). Author (GRA)

N84-13426# Naval Research Lab., Washington, D. C.
ON A RELATION BETWEEN MAXIMUM-LIKELIHOOD CLASSIFICATION AND MINIMUM CROSS-ENTROPY CLASSIFICATION Interim Report
John E. Shore 14 Jul. 1983 7 p
(RR01409)
(AD-A132237; AD-E000540; NRL-8707) Avail: NTIS HC A02/MF A01 CSCL 17/2

The report considers maximum likelihood (ML) and minimum cross entropy (MCE) classification of samples from an unknown probability density when the hypotheses comprise an exponential family. It is shown that ML and MCE lead to the same classification rule, and the result is illustrated in terms of method for estimating covariance matrices recently developed by Burg, Luenberger, and Wenger. The MCE classification applies to the general case in which it cannot be assumed that the samples were generated by one of the hypothesis densities. The common use of ML in this case is technically incorrect, but the equivalence of MCE and ML provides a theoretical justification. GRA

N84-13427# Ohio State Univ., Columbus. Electroscience Lab.
ADAPTIVE ARRAY BEHAVIOR WITH PERIODIC PHASE MODULATED INTERFERENCE
A. S. Al-Ruwais and R. T. Compton, Jr. Jul. 1983 47 p
(Contract N00019-82-C-0190)
(AD-A132229; AD-E401062; ESL-714505-3) Avail: NTIS HC A03/MF A01 CSCL 09/5

This report discusses the behavior of an LMS adaptive array when receiving a phase modulated interference signal. A mathematical technique is presented for computing the time behavior of the array weights with such interference. This technique is then used to study the behavior of a 2-element array receiving an interference signal with sinusoidal phase modulation. The effects of the interference phase modulation on desired signal modulation, output SINR (signal-to-interference-plus-noise ratio) and desired signal bit error probability are discussed. Author (GRA)

N84-13428# Aerospace Corp., El Segundo, Calif. Electronics Research Lab.
APERTURE AVERAGING OF SCINTILLATION FOR SPACE-TO-GROUND OPTICAL COMMUNICATION APPLICATIONS
Hal T. Yura and W. G. McKinley 15 Aug. 1983 14 p
(Contract F04701-82-C-0083)

(AD-A132198; TR-0083(3925-04)-1; SD-TR-83-48) Avail: NTIS HC A02/MF A01 CSCL 17/2

We derive an useful engineering formula for the aperture averaging factor of optical scintillation that exhibits the explicit parametric dependence on wavelength, collector diameter, and path weighted integrals of the index structure constant profile. Numerical results presented here indicate that care should be exercised in the application of available index structure constant profile models to optical communication system performance studies. Author (GRA)

N84-13429# Naval Postgraduate School, Monterey, Calif.
SIGNAL PROCESSOR INTERFACE SIMULATION OF THE AN/SPY-1A RADAR CONTROLLER M.S. Thesis
Todd B. Kersh Jun. 1983 95 p
(AD-A132170; AD-E850405) Avail: NTIS HC A05/MF A01 CSCL 17/9

This thesis reports on the design and implementation of a simulation of the Signal Processor Interface to the AN/SPY-1A Phased Array Radar Controller. Inherent to the simulation is the development of a representative time sensitive database of the targeting environment. The programming language Ada was utilized as a program development language in the design for the database. The developed Target Database utilizes the 20 mega-byte REMEX Data Warehouse 3200 memory storage unit. The simulation of the Signal Processor Interface will allow real time testing of the Naval Postgraduate School's AN/SPY-1A Radar Controller System Model. Author (GRA)

N84-13430# Naval Research Lab., Washington, D. C. Applied Optics Branch.
A COMPACT OPTICAL PULSE COMPRESSOR WITH COMPUTER-GENERATED HOLOGRAPHIC MASKS FOR RADAR APPLICATIONS Progress Report, 23 Apr. - 30 Sep. 1982
S. C. Lin, R. A. Athale, and John N. Lee 24 Aug. 1983 27 p
(AD-A132152; AD-E850405; NRL-MR-5134) Avail: NTIS HC A03/MF A01 CSCL 17/9

A compact acoustooptical (A-O) pulse compressor using computer generated holographic masks to generate and to match filter the return pulses has been demonstrated to be suitable for radar use. The basic working principle of the system is given. Descriptions of the A-O Bragg cell, the computer generated holographic masks, carrying 4-bit, 7-bit, and 13-bit Barker codes and pseudorandom codes up to a length of 511 bits, and the unique use of a diode laser as the light source are given. Experimental results are given for all the Barker codes and pseudorandom codes up to 127 bits. The results showed very good agreement with the theoretical predictions. For codes longer than 127 bits, it was found that a longer, high quality acoustooptical interaction region in the Bragg cell must be obtained to ensure better correlation. This can be done through crystal selection and transducer apodization. The dynamic range of the system is 40 dB with high linearity at 7 mW of diode laser output. Finally, specific areas, which are important to the enhancement of the system versatility and agility, are recommended for future work. These are: (1) multichannel device for agility; (2) ECL digital storage units for preprogrammed waveforms and for generating time-reversed reference waveforms; (3) Doppler shift cancellation and Doppler shift scanning; and (4) system miniaturization and ruggedization. Author (GRA)

N84-13431# Delta Information Systems, Inc., Jenkintown, Pa.
STUDY OF POTENTIAL STANDARDIZATION OF VIDEO TELE-CONFERENCING SYSTEMS. VOLUME 2: APPENDICES Final Report
Robert V. Cotton and Richard A. Schaphorst May 1983 68 p
(Contract DCA100-82-C-0061)
(AD-A132081; TSI-83-19-Vol-2; NCS-TIB-83-4-Vol-2) Avail: NTIS HC A04/MF A01 CSCL 17/2

Several full-motion TV teleconferencing systems using non-compatible systems motion Codecs were implemented. These systems operate at various data rates with varying degrees of performance. In order to provide for the compatibility and interoperability among video teleconferencing systems, a study was initiated to compare existing motion Codecs to determine the feasibility of establishing federal standards. The objective was to identify those parameters which would require standardization in order to achieve interoperability in full-motion video teleconferencing systems. R.J.F.

N84-13432# Delta Information Systems, Inc., Jenkintown, Pa.
STUDY OF POTENTIAL STANDARDIZATION OF VIDEO TELE-CONFERENCING SYSTEMS, VOLUME 1 Final Report, Jul. 1982 - Mar. 1983
Robert V. Cotton and Richard A. Schaphorst May 1983 181 p
(Contract DCA100-82-C-0061)
(AD-A132080; TSI-83-16-Vol-1; NCS-TIB-83-4-Vol-1) Avail: NTIS HC A09/MF A01 CSCL 17/2

Several different full-motion TV teleconferencing systems using non-compatible motion codecs have been implemented. These video teleconferencing systems operate at various data rates with varying degrees of performance. In order to provide for the compatibility and interoperability among video teleconferencing systems, the study was initiated by the National Communications System to compare existing motion codecs to determine the feasibility of establishing federal standards. The objective was to identify those parameters which would require standardization in order to achieve interoperability in full-motion video teleconferencing systems. Author (GRA)

N84-13433# Los Alamos Scientific Lab., N. Mex.
MICROWAVE GENERATORS: OSCILLATING VIRTUAL CATHODES AND REFLEXING ELECTRONS
Thomas J. T. Kwan and Lester E. Thode 1983 4 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12 Sep. 1983
(Contract W-7405-eng-36)
(DE84-001346; LA-UR-83-2602; CONF-830911-27) Avail: NTIS HC A02/MF A01

Simulation of the generation of a relativistic electron beam in a foil diode configuration and of the subsequent intense microwave generation resulting from the formation of the virtual cathode is presented. The oscillating virtual cathode and the trapped beam electrons between the real and the virtual cathodes were found to generate microwaves. Generation of high-power microwaves with about 10% efficiency might be reasonably expected from such a virtual-cathode configuration. DOE

N84-13434# General Electric Co., Oak Ridge, Tenn.
A PROPOSED RF-TECHNOLOGY R/D PLAN FOR THE UNITED STATES
W. R. Becraft, O. C. Eldridge (ORNL), N. H. Haselton (ORNL), D. J. Huffman (ORNL), N. S. Ponte (ORNL), G. M. Haas (DOE, Washington, D.C.), and P. J. Kortman (Science Applications, Inc., Gaithersburg, Md.) 1983 5 p Presented at the 12th Symp. on Fusion Technol., Juelich, West Germany, 13 Sep. 1982
(Contract W-7405-eng-26)
(DE84-000643; CONF-820948-13) Avail: NTIS HC A02/MF A01

The planned use of rf energy in the US magnetic-confinement devices has increased significantly in the past few years. An attendant growth in programs to develop rf technology to support physics experiments and to prepare for future reactor-like machins is needed. This paper summarizes a draft of a proposed plan, with emphasis on the1983 progra, as prepared with the assistance of US laboratories, universities, and industries with major involvement in RF uses for fusion. The major efforts in 1983 include: specific coupler development, design and fabrication of test facilities, and the detaled assessment of the need for higher-power-component developments. DOE

N84-13435# Department of Energy, Washington, D. C. Office of Health and Environmental Research.
STANDARD NIM DIGITAL BUS (NIM/GPIE)
Aug. 1983 18 p refs
(DE83-017865; DOE/ER-0173) Avail: NTIS HC A02/MF A01

A standard digital data bus for nuclear instrument module (NIM)

instruments as defined in DOE Publication TID-20893 utilizes the General Purpose Instrumentation Bus (GPIB) of ANSI/IEEE Std 488-1978 and the Code and Format conventions of ANSI/IEEE Std 728-1982 of the Institute of Electrical and Electronics Engineers (IEEE) and the American National Standards Institute (ANSI). Additional requirements and recommendations are included to maximize compatibility of NIM instruments utilizing the bus. DOE

N84-13436# California Univ., Livermore. Lawrence Livermore Lab.
NOVANET: COMMUNICATIONS NETWORK FOR A CONTROL SYSTEM
J. R. Hill, J. R. Severyn, and P. J. VanArsdall 23 May 1983 29 p refs Presented at the 8th Data Commun. Symp., Cape Cod, Mass., 3-6 Oct. 1983
(Contract W-7405-eng-48)
(DE83-013862; UCRL-89218; CONF-831091-1) Avail: NTIS HC A03/MF A01

NOVANET is a control system oriented fiber optic local area network that was designed to meet the unique and often conflicting requirements of the Nova laser control system which will begin operation in 1984. The computers and data acquisition devices that form the distributed control system for a large laser fusion research facility need reliable, high speed communications. Both control/status messages and experimental data must be handled. A subset of NOVANET is currently operating on the two beam Novette laser system. DOE

N84-13437# Illinois Univ., Urbana-Champaign. Dept. of Physics.
THE FASTBUS SEGMENT DRIVER MICROCODE DESCRIPTION
D. Lesny Jun. 1983 96 p refs
(Contract DE-AC02-76ER-01195)
(DE83-017972; DOE/ER-01195/477; COO-1195-477) Avail: NTIS HC A05/MF A01

The FASTBUS segment driver, (FSD) is a list driven, microcoded interface between the UNIBUS of a PDP-11 system and the FASTBUS. The list structure used by the FSD allows the programmer on the PDP-11 to program a sequence of data transfers to take place without the aid or intervention of the PDP-11. This allows the FASTBUS to be driven at FSD rates, independent of the PDP-11 processor. Due to the difference in speed between the FASTBUS and UNIBUS, the major goal of the FSD was to provide an interface which could transfer data on FASTBUS without significantly reducing the bandwidth in a multi master system. This was accomplished by bursting data on the FASTBUS through a 256 word fast buffer internal to the FSD. Data can be transferred at near FASTBUS rates through this memory and only moved on the UNIBUS when the FSD is not master of FASTBUS. This allows other masters in the same system to transfer their data while the FSD is moving data on the slower UNIBUS. DOE

N84-13438# California Univ., Livermore. Lawrence Livermore Lab.
AIR-BREAKDOWN LIMITS FOR MICROWAVE-PULSE PROPAGATION. PART 1. EXPERIMENTS
D. P. Byrne, R. A. Alvarez, and R. M. Johnson (EM Design) Sep. 1983 40 p refs
(Contract W-7405-eng-48)
(DE83-017832; UCID-19877-Pt-1) Avail: NTIS HC A03/MF A01

Breakdown power levels for short pulses of 2.856-GHz microwaves in a test section of WR-284 waveguide filled with air at several pressures in a range extending from 0.1 Torr to several hundred Torr were measured. The traveling wave input was a pulse with a risetime of approximately 50 nanoseconds, a length of 100 ns (fwhm), and an amplitude of approximately 15 MW. Input power transmitted power was monitored with directional couplers and fast diodes: reflected power was also monitored on some measurements. Breakdown power for a given air pressure is defined as the power level (generally on the leading edge of the pulse) at which extreme attenuation of the transmitted pulse occurs. Results are presented because they are the only single pulse microwave data that exist for pulse lengths below 100 ns. The data are compared with predictions of simple cascade theory, existing microwave breakdown data, video pulse breakdown data, and recent LLNL fluid model predictions. DOE

N84-13439# Los Alamos Scientific Lab., N. Mex.
PROPAGATION OF A RADIO-FREQUENCY PULSED SIGNAL OVER THE EARTH. THE JOLLY PROGRAMS
Dan Carroll, J. Lewis Detch (Edgerton, Germeshausen and Grier, Inc., Santa Barbara, Calif.), and John Malik Jul. 1983 76 p refs
(Contract W-7405-eng-36)
(DE84-000109; LA-9814-MS) Avail: NTIS HC A05/MF A01

The interpretation of observed radioflash/electromagnetic pulse (emp) observed signals from nuclear detonations in terms of theoretical models or extrapolation to signals expected at military systems involves correction for ground-wave propagation effects. For most applications, previously developed programs have been adequate. There have been problems when these techniques have been tried for situations in the near tangent regime where a considerable concern exists. It has been found that the problem of predicting propagation response functions in the near tangent regime has been the inconsistent derivation of the equations. Resolution of this problem has evolved into a program to better predict ground-wave propagation. The description of the method and detailed description of the programs are described for both propagation over realistic earth and sea-water paths. Results can be given in terms of amplitude and phase as a function of the frequency or as amplitude versus time, the usual Green's or resolution function. DOE

N84-13440# Los Alamos Scientific Lab., N. Mex. Advanced Concepts and Plasma Applications Group.
PULSED-POWER DIODE GENERATION OF HIGH-POWER MICROWAVES
Anthony L. Peratt, Michael A. Mostrom, Thomas J. T. Kwan, and Lester E. Thode 1983 5 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12-14 Sep. 1983
(Contract W-7405-eng-36)
(DE84-001344; LA-UR-83-2622; CONF-830911-31) Avail: NTIS HC A02/MF A01

The generation of microwave radiation at gigahertz frequencies in high-voltage pulsed-power diodes was investigated with electromagnetic particle simulations. Pulsed power in the form of a 0.5-1.0 MV, TEM wave is fed to the diode via a 5 cm diameter cylindrical stalk onto which a 30 cm diameter cathode was mounted. Located some 3 to 5 cm in front of the cathode is a foil anode grid. As the TEM wave propagates between the stalk and an outer cylindrical cage (70-cm diameter) a stream of electrons are emitted off the stalk when the local electric field exceeds 200 kV/cm. This flow is then magnetically insulated and confined by the induced B/sub theta/ fields resulting from the 25- to 50-kA current flow within the stalk. Convex shaping of the cathode surface allows the emitted electrons to form a virtual cathode beyond the grid, then phase bunch to produce narrow bandwidth 1-GHz microwaves over an area equal to that of the cathode. The electromagnetic radiation from the dipole-like electron motions centered on the grid, which follow closely the classical Barkhausen-Kurz description, are reported. DOE

N84-13441# JAYCOR, Santa Monica, Calif.
EXTERNAL WAVE-LAUNCHER STUDY Final Report
30 Jun. 1983 69 p refs
(Contract DE-AC03-82ER-52083)
(DE84-001124; DOE/ER-52083/T1) Avail: NTIS HC A04/MF A01

The rationale for liquid dielectrically-loaded external waveguide launchers is discussed. The arguments are strongly indicative that a liquid dielectric-filled waveguide system could be a practical technique for launching ICRH power into a fusion reactor. A detailed summary of the work performed in the study is presented. DOE

N84-13442# Institute for Telecommunication Sciences, Boulder, Colo.
FURTHER INVESTIGATIONS OF THE MULTIPLE KNIFE-EDGE ATTENUATION FUNCTION
L. E. Vogler May 1983 29 p refs Sponsored by National Security Agency
(PB83-245043; NTIA/Report-83-124) Avail: NTIS HC A03/MF A01 CSCL 20N

The multiple knife-edge MKE attenuation function is derived from Federal Fresnel-Kirchhoff theory and compared with the original derivation from Furutsu's generalized residue series. It is shown that the two methods give complex attenuations with the same absolute magnitude but differing in phase. The analytical basis for an improved computational procedure is developed that eliminates the changeover values and abrupt discontinuities of attenuation inherent in the original MKE computer program. A brief discussion of precious MKE diffraction results is presented and an example comparison is made with the Geometrical Theory of Diffraction and the approximations of Epstein-Peterson and Deygout. Author (GRA)

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N84-13443*# Allen-Bradley Co., Torrance, Calif. Power Transistor Components.
DEVELOPMENT AND FABRICATION OF A HIGH CURRENT, FAST RECOVERY POWER DIODE Final Report
Albert H. Berman, Vilnis Balodis, Darrell C. Devarice, Charles E. Gaugh, and Eric A. Karlson Oct. 1983 70 p refs
(Contract NAS3-23280)
(NASA-CR-168196; NAS 1.26:168196) Avail: NTIS HC A04/MF A01 CSCL 09C

A high voltage (VR = 1200 V), high current (IF = 150 A), fast recovery (< 700 ns) and low forward voltage drop (< 1.5 V) silicon rectifier was designed and the process developed for its fabrication. For maximum purity, uniformity and material characteristic stability, neutron transmutation n-type doped float zone silicon is used. The design features a hexagonal chip for maximum area utilization of space available in the DO-8 diode package, PIN diffused junction structure with deep diffused D(+) anode and a shallow high concentration n(+) cathode. With the high temperature glass passivated positive bevel mesa junction termination, the achieved blocking voltage is close to the theoretical limit of the starting material. Gold diffusion is used to control the lifetime and the resulting effect on switching speed and forward voltage tradeoff. For solder reflow assembly, trimetal (Al-Ti-Ni) contacts are used. The required major device electrical characteristics were achieved. Due to the tradeoff nature of forward voltage drop and reverse recovery time, a compromise was reached for these values. Author

N84-13444# National Inst. for Aeronautics and Systems Technology, Pretoria (South Africa).
PHASE LOCKED LOOP THEORY AND APPLICATION: A PRECISE PAPER
R. G. W. Thomson Jul. 1982 49 p refs
(CSIR-NIAST-82/57; ISBN-0-7988-2547-2) Avail: NTIS HC A03/MF A01

The theory of operation of analog phase locked loops is reviewed. Their application in various tracking situations and conditions of noise is discussed. Practical design and testing recommendations are made. Author

N84-13445# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
L BAND LOW NOISE AMPLIFIER PROJECT [PROJETO DE AMPLIFICADORES DE BAIXO RUIDO M BANDA L]
Eduardo Antonio Parada Tude Jul. 1983 16 p refs Presented at the 35th Ann. Reunion of the SBPC, Belem, Brazil, 6-13 Jul. 1983
(INPE-2794-PRE/356) Avail: NTIS HC A02/MF A01

The design of L band low noise amplifiers is discussed including the components available the problems encountered in this band. Two balanced amplifiers in 1.7 GHz for the WEFAX conversor are described. The first uses bipolar transistors and the second GaAs FETs. Author

N84-13446# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
INTAC: A COMPUTER-AIDED TEST INTERFACE M.S. Thesis [INTAC - UMA INTERFACE DE TESTS AUXILIADA POR COMPUTADOR]
Marcos Antonio Cardoso Cruz Jun. 1983 120 p
(INPE-2792-TDL/138) Avail: NTIS HC A06/MF A01

A model of an automatic functional testing system for analog and digital circuits is presented. The proposed configuration is implemented by a microprocessor based testing station, connected to a central programming station. Interfacing facilities with the unit under test (UUT) are available at testing station, while test program development facilities are available in central station. The UUT real time behavior, during execution of tests, is simulated by a clock control unit. The test oriented language, denominated INTAC, is presented. The main purpose of the language is to describe and generate test programs to be used in the testing station. Author

N84-13447# Overseas Relations Branch Translation Service, London (England).
THE EFFECT OF WATER ON THE DIELECTRIC PERFORMANCE OF A CABLE
Y. Parasie, A. Pinet, and D. Roy 13 Sep. 1983 14 p refs Transl. into ENGLISH of conf. paper no. 2 presented at the S.E.E. Section 12 Conf., 1983 14 p Conf. held in Gif-Sur-Yvette, France, 2 Jun. 1983
(BLL-OA-Trans-2634-(6196.3)) Avail: NTIS HC A02/MF A01

The behavior of HM 33-S-23 cable in the presence of water was studied and the deterioration in dielectric performance was determined by comparing a sound cable. For this purpose, samples with their conductors filled with water were subjected to continuous test voltages equal to 2, 3, and 5 times the rated voltage, with load cycles. It was shown in particular that water permits the discovery of nonuniformities in the insulation by leading to breakdown after a period of application of the voltage that depends on the nature and size of these defects. It was established that in the absence of water these same nonuniformities do not materially affect the life of these cables. S.C.L.

N84-13448# Overseas Relations Branch Translation Service, London (England).
SERVICE EXPERIENCE OF EDF 20 kV XLPe INSULATED CABLE
J. Ferran 13 Sep. 1983 20 p refs Transl. into ENGLISH of conf. paper no. 1 presented at the S.E.E. Section 12 Conf., 1983 11 p Conf. held in Gif-Sur-Yvette, France, 2 Jun. 1983
(BLL-OA-Trans-2633-(6196.3)) Avail: NTIS HC A02/MF A01

The MV network cable with synthetic insulation was studied, and the various stages in this technical development are outlined. The operational requirements are recalled, and the principal performances of the cable presented. The service results of networks equipped with the cable are compared for the past few years with results from existing networks using cables with impregnated paper insulation. The ease of installation of the cable, the development of connection accessories that are easier to handle and more reliable than those used on cables with impregnated paper insulation, and the development of mechanical

laying techniques, should lead to wider use of underground cable in certain rural areas. S.L.

N84-13449# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CHINA BUILDS FIRST 6000KV TYPE PULSE VOLTAGE GENERATOR
24 Aug. 1983 4 p Transl. into ENGLISH from Guagning Ribao (China), 19 Oct. 1978 p 1
(AD-A132564; FTD-ID(RS)T-408-83) Avail: NTIS HC A02/MF A01 CSCL 09/3

China's first high parameter outdoor pulse generator was built in Beijing and is in use. This high parameter pulse voltage generator is test equipment which is indespensible for the development of super-high voltage electrical transmission. Lightning waves are simulated as well as the operational overvoltage waves which are produced when operating electric power equipment. The energy of the lightning strokes and operational overvoltages to which electrical transmission and transformer equipment are exposed, were studied and evaluated. Author

N84-13450# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
WAFER-SCALE INTEGRATION OF SYSTOLIC ARRAYS
Frank Thomson Leighton and Charles E. Leiserson Feb. 1983 31 p
(Contract N00014-80-C-0622)
(AD-A132536; MIT/LCS/TM-236) Avail: NTIS HC A03/MF A01 CSCL 09/5

VLSI technologies are fast developing wafer-scale integration. Rather than partitioning a silicon wafer into chips as is usually done, the idea behind wafer-scale integration is to assemble an entire system (or network of chips) on a single wafer, thus avoiding the costs and performance loss associated with individual packaging of chips. A major problem with assembling a large system of microprocessors on a single wafer, however, is that some of the processors, or cells, on the wafer are likely to be defective. In the paper, we describe practical procedures for integrating wafer-scale systems 'around' such faults. The procedures are designed to minimize the length of the longest wire in the system, thus minimizing the communication time between cells. Although the underlying network problems are NP-complete, we prove that the procedures are reliable by assuming a probabilistic model of cell failure. We also discuss applications of this work to problems in VLSI layout theory, graph theory, fault-tolerant systems and planar geometry. GRA

N84-13451# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
OUTLINE OF METHODS FOR DESIGN OF SUPERCONDUCTING TURBOGENERATORS
L. Antal and J. Uczkiewicz 18 Aug. 1983 16 p Transl. into ENGLISH from Przegl. Elektrotech. (Poland), v. 56, no. 8-9, 1980 p 392-395
(AD-A132528; FTD-ID(RS)T-1096-83) Avail: NTIS HC A02/MF A01 CSCL 10/2

Heat calculations of a rotor comprizing a superconducting winding cooled by liquid helium, electromagnetic calculations of the excitation winding shielding, dynamic stability studies, strength calculations of the supporting structure of the rotor and the structure clamping the slotless armature winding are examined. A need exists for formulating an algorithm which determines rationally basic design magnitudes of superconducting generators on the basis of a synthesis of the result of analyses of individual phenomena. Author

N84-13452# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
COMPUTER-AIDED SYNTHESIS AND DESIGN OF MONOLITHIC MICROWAVE GaAs MESFET AMPLIFIERS Ph.D. Thesis
Jerome Thomas Dijak Aug. 1983 181 p
(AD-A132474; AFIT/CI/NR-83-19D) Avail: NTIS HC A09/MF A01 CSCL 09/5

The computer-aided procedures for systematic design of lumped and distributed element even-order amplifier matching networks are extended to include odd-order networks. The gain-bandwidth performance of general odd-order networks as well as that of several specific odd-order topologies of special interest are discussed. Practical monolithic input, output, and interstage matching network topologies using both lumped and distributed elements are shown, and the potential for reducing required chip area by using networks of 3rd order in lieu of 4th order is shown for both low-noise and power amplifier examples. Analytical techniques are presented for computing the maximum realizable value of the denominator polynomial constant of odd-order gain functions in both the lumped and distributed element cases for 3rd order networks of arbitrary ripple, bandwidth, minimum insertion loss, and gain slope. GRA

N84-13453# Hawaii Univ., Manoa. Dept. of Electrical Engineering.
A RECTANGULAR GATE MERGED MOSBJT Final Report
David Okada and James W. Holm-Kennedy Jul. 1983 29 p
(Contract N00014-76-C-1081)
(AD-A132450; FR-1) Avail: NTIS HC A03/MF A01 CSCL 09/1

The design, fabrication, and device characteristics of a rectangular gate MOSBJT are described. The characteristics are explained in terms of the merged character of the device and the self-biasing effects of the distributed collector current on the collector channel/base bias. For sufficiently high collector currents a portion of the collector channel is self-biased resulting in a decreased beta. The active area of the device is then controlled by the device operating bias. Author (GRA)

N84-13454# Hawaii Univ., Manoa.
THE BJT-JFET: A NOVEL MERGED DEVICE STRUCTURE Final Report
Leng-Seow Tan and James W. Holm-Kennedy Jul. 1983 28 p
(Contract N00014-76-C-1081)
(AD-A132373; FR-3) Avail: NTIS HC A03/MF A01 CSCL 09/1

A novel semiconductor device, the BJT-JFET, is described. The fabrication of the device is described and the device characteristics are explained in terms of the fully merged nature of the device and the self-biasing effects of the distributed collector current on the collector/channel base bias. A simple analytical model is developed. The results are consistent with the conceptual understanding of the operation of the device. Author (GRA)

N84-13455# Office of Naval Research, London (England).
INTERNATIONAL MEETING ON LITHIUM BATTERIES
J. J. Smith 7 Jul. 1983 11 p Meeting held in Rome, 27-29 Apr. 1982
(AD-A132371; ONRL-C-11-83) Avail: NTIS HC A02/MF A01 CSCL 10/3

The conference papers highlighted research results in the electrochemistry of lithium batteries; relatively little emphasis was placed on battery systems. Sessions of the conference addressed the following aspects of lithium battery technology: lithium cyclability, lithium passivation, oxide cathodes, insertion cathodes, solid electrolytes, and polymer electrolytes. Author (GRA)

N84-13456# Hawaii Univ., Manoa. Dept. of Electrical Engineering.
NUMERICAL MODELING OF THE MOSBJT Final Report
David Okada and James W. Holm-Kennedy Jul. 1983 27 p
(Contract N00014-76-C-1081)
(AD-A132351; AD-E950428; FR-2) Avail: NTIS HC A03/MF A01 CSCL 09/1

A totally merged MOSFET and BJT has been proposed. The device exhibits complicated nonlinear characteristics under certain operating conditions. Due to the distributed character of this novel merged device, a straightforward lumped device approach is not adequate. A distributed model is proposed and analyzed using numerical techniques. The active device area is shown to be affected by bias and contributes to the nonlinear character of the characteristics under suitable conditions. Several gate shapes are treated. Author (GRA)

N84-13457# Rockwell International Corp., Thousand Oaks, Calif. Microelectronics Research and Development Center.
LOW-POWER RADIATION-HARD GaAs RAM Semiannual Technical Report, 10 Dec. 1982 - 9 Jun. 1983
Ricardo Zucca and R. Vahrenkamp Aug. 1983 45 p
(Contract MDA903-83-C-0067; ARPA Order 4100)
(AD-A132325; AD-F630051; MRDC41131.3SA) Avail: NTIS HC A03/MF A01 CSCL 09/1

The scope of this program is to demonstrate a 4K GaAs static RAM having very low power dissipation, 1 microwatt bit in standby, and a short access time, 10 ns, to meet the requirements of the DARPA Advanced On-Board Signal Process (AOSP). At the end of the previous program, a RAM cell capable of the required power dissipation had been developed and a 256-bit RAM had been demonstrated. In the six-month period covered by this report, the processing of several lots of three-inch wafers with 256-bit RAMs (mask set RM3) was completed. Modifications to the Cermet deposition process for high value resistors were required to adapt to the processing of 3-inch wafers, resulting in resistor uniformity that is good or better than the Cermet resistor uniformity formerly achieved for 1-inch wafers. Testing of the 256-bit RAM has been completed. A total of 15 totally functional RAMs have been identified. The read access time was as low as 1 ns. Write operations could be performed with 2 ns write pulses. A 1K RAM was designed, and the corresponding mask set was completed, except for final checking and placement of the circuits on the reticle. Small changes in cell design were made to achieve higher tolerance to threshold voltage variation and to leakage currents. GRA

N84-13458# Honeywell Power Sources Center, Horsham, Pa.
SAFETY STUDIES ON Li/SOCl-2 RESERVE BATTERY Final Report, 30 Sep. 1981 - 30 Mar. 1983
Narayan Doddapaneni May 1983 108 p
(Contract N60921-81-C-0305)
(AD-A132279) Avail: NTIS HC A06/MF A01 CSCL 10/3

The effects of cell design and metal-phthalocyanine catalysts on the safety of Li/SOCl2 reserve cells were evaluated. Cathode-limited design cells either vented or exploded during forced overdischarge. Both forced overdischarge current density, and overdischarge time into reversal influenced the cell failure unpredictably. Anode-limited design cells, on the other hand, generated severe internal heat during reversal, but sustained higher forced overdischarge current densities than cathode-limited design cells without either venting or exploding. When the 1.5M LiAlCl4/SOCl2 was replaced with 1.5M LiAlCl4/SO2Cl2 electrolyte in the cathode-limited design cells, both the cell discharge life and cell safety improved. The catalyst stability and stainless steel (bellow material) compatibility were also studied in both neutral and acidic electrolytes. The catalyst was found to be stable and the stainless steel specimens (316L and 321) experienced only surface corrosion after 12-month storage. The surface film formed during the initial surface corrosion appeared to inhibit further corrosion. Heat cool cycles between -40 and 71 C of fresh cells and partially or fully discharged D-cells did not adversely influence the cell pressure at the end of 100% depth of discharge. Author (GRA)

N84-13459# Frequency Electronics, Inc., Mitchel Field, N.Y.
VIBRATION RESISTANT QUARTZ CRYSTAL RESONATORS Final Report, 28 Oct. 1979 - 28 Feb. 1982
B. Goldfrank and A. Warner Nov. 1982 98 p
(Contract DAAK20-79-C-0272; DA Proj. 1L1-62705-AH-94)
(AD-A132274; DELET-TR-79-0272-F) Avail: NTIS HC A05/MF A01 CSCL 09/1

The principal objectives of this investigation were to provide doubly rotated quartz crystal resonators that exhibit low 'g' sensitivity on the order of 1 superscript 10 per 'g', and fast warm-up on the order of 1 superscript 9 in three minutes. Effects of changes in the mounting orientation have been investigated with respect to the magnitude of the acceleration sensitivity vector, for 0 angles of 21.95, 23.75 and 25.00, using 5 MHz/5th overtone plano-convex and bi-convex quartz crystal blanks. The mounting technique was three-point thermo-compression bonding; the mounts were 90 degrees apart. A new thermo-compression bonding ribbon was evaluated and instituted. 5 MHz and 10 MHz, third overtone crystals and 20 MHz fifth overtone crystals were measured for the magnitude of the acceleration sensitivity vector. Improved methods of X-ray orientation were also investigated. Author (GRA)

N84-13460# Oklahoma State Univ., Stillwater. Electronics Lab.
PROCESSOR-CONTROLLED DAC-20 (DIGITAL-TO-ANALOG CONVERTER)
W. A. Holloway and J. W. Spears 15 May 1983 76 p
(Contract F19628-81-C-0079; AF Proj. 7659)
(AD-A132260; SR-3; AFGL-TR-83-0124) Avail: NTIS HC A05/MF A01 CSCL 09/5

The Processor Controlled DAC is a PCM World Selector, controlled by dual 6502B microprocessors. It was developed for a high word rate PCM system, and as a flexible unit to be used with almost any PCM format. This multi-channel DAC (digital-to-analog converter) is capable of selecting up to 32 separate word patterns and can produce up to 30 outputs with additional DAC's. At present, 18 DAC outputs are offered with 0 to +10 volt outputs. Details of circuit design, operation, and software are covered in this report. GRA

N84-13461# Pennsylvania State Univ., University Park. Materials Research Lab.
TARGETED BASIC STUDIES OF FERROELECTRIC AND FERROELASTIC MATERIALS FOR PIEZOELECTRIC TRANSDUCER APPLICATIONS Final Report, 1 Dec. 1982 - 31 Dec. 1983
L. E. Cross, R. E. Newnham, G. R. Barsch, and J. V. Biggers Mar. 1983 320 p
(Contract N00014-78-C-0291)
(AD-A132136; AD-E850405) Avail: NTIS HC A14/MF A01 CSCL 09/1

The work reported covers the fifth and final year of the program of targeted basic studies of ferroelectric and ferroelastic materials for piezoelectric transducer applications. Major achievements include: the development of a physical approach to understanding active composites, leading to the development of several new families of PZT, polymer piezoelectric composites for hydrophone application. These are new advances in the phenomenology and microscopic theory of electrostriction, and the evolution of a new family of high strain ferroelectric relaxor materials for practical application. New basic understanding of the polarization mechanisms in ferroelectric relaxors has been aided by the study of order disorder of the cation arrangement in lead scandium tantalate, and the results correlate well with studies of relaxor behavior, and of shape memory effects in PLZT ceramics. Low temperature studies on pure and doped PZTs have given the first clear indication of the intrinsic (averaged) single domain in response and correlate exceedingly well with earlier phenomenological theory. Crystal growth and ceramic processing studies have developed hand in hand with program needs providing new forms of conventional materials, new grain oriented structures and single crystals. GRA

N84-13462# Brigham Young Univ., Provo, Utah. Dept. of Chemical Engineering.
BATTERY TRANSPORT DATA Final Report, 1 May 1982 - 30 Apr. 1983
Satish D. Bhakta and Douglas N. Bennion Apr. 1983 39 p refs
(Contract DE-AC03-76SF-00098)
(DE84-001640; LBL-16556) Avail: NTIS HC A03/MF A01

Measurements of the equilibrium properties have been accomplished for NaOH-H2O-Nafion membrane system. The data for 1, 4, 8, and 12 M NaOH at temperatures of 280C, 500C, 700C, and 900C were obtained by a combination of soaking, blotting, weighing, and analysis techniques. The parameters determined were: (1) membrane anion concentration; (2) membrane water concentration; (3) membrane fixed ion concentration; and (4) wet membrane density. The water concentration in the membrane decreased with the external NaOH concentration at a given temperature whereas the other parameters increased. Electrodialysis and dialysis measurements have also been made at room temperature using a cell similar to the one used by Pintauro

(1980). There was a problem of gassing of the electrode which made it impossible to accurately measure the volumetric flow through the membrane. Nickel and cadmium porous electrodes were tried unsuccessfully. On the porous Ni electrode, the gassing was not as much as that observed with Cd electrodes. The concentration difference and the volumetric flow rate through the membrane were measured. DOE

N84-13463# Exxon Research and Engineering Co., Linden, N.J. Advanced Energy Systems Lab.
DEVELOPMENT OF A CIRCULATING ZINC-BROMINE BATTERY, PHASE 2 Final Report
R. Bellows, H. Einstein, P. Grimes, E. Kantner, P. Malachesky, K. Newby, H. Tsien, and A. Young Oct. 1983 165 p refs
(Contract DE-AC04-76DP-00789)
(DE84-001886; SAND-83-7108) Avail: NTIS HC A08/MF A01

This report summarizes Phase 2 of a multi-phase program aimed at developing Exxon's circulating zinc-bromine battery into an advanced energy storage system. Previous work at Exxon had developed a basic zinc-bromine battery system approach. This approach utilizes carbon-plastic electrodes in a bipolar stack design, a circulating electrolyte with separable bromine complexes, and shunt current protection. Phase 2 was highlighted by the successful scale-up and demonstration of a 20 kWh zinc-bromine battery module. Important technology improvements were demonstrated in the areas of extended life cycling, low cost stack technology, high power/high efficiency supported electrolytes, and system auxiliaries. The basic technology was augmented via increases in parametric testing, materials testing, and electrolyte studies. Production cost estimates from Phase 1 ($28/kWh in 1980) were projected to an OEM price of $37/kWh using the A.D. Little costing method. A design has been developed for a prototype 20 kWh energy storage system which will be delivered to Sandia National laboratories in 1983 near the completion of Phase 3. DOE

N84-13464# Johnson Controls, Inc., Milwaukee, Wis.
RESEARCH, DEVELOPMENT AND DEMONSTRATION OF LEAD-ACID BATTERIES FOR ELECTRIC VEHICLE PROPULSION Annual Report
Donald E. Bowman Aug. 1983 70 p
(Contract W-31-109-eng-38)
(DE84-000468; ANL/OEPM-83-9) Avail: NTIS HC A04/MF A01

Research programs on lead-acid batteries are reported that cover active materials utilization, active material integrity, and some technical support projects. Processing problems were encountered and corrected. Components and materials, a lead-plastic composite grid, cell designs, and deliverables are described. Cell testing is discussed, as well as battery subsystems, including fuel gage, thermal management, and electrolyte circulation. DOE

N84-13465# Sandia Labs., Albuquerque, N. Mex.
LOW-INDUCTANCE, DUAL-FEED DIODE DEVELOPMENT
M. A. Hedemann, M. A. Stark, J. P. Reilly, P. W. Spense, and H. Kishi 1983 18 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12 Sep. 1983 Prepared in cooperation with Pulse Sciences, Inc., San Leandro, Calif.
(Contract DE-AC04-76DP-00789)
(DE84-000117; SAND-83-0223C; CONF-830911-16) Avail: NTIS HC A02/MF A01

Three low inductance, subohm impedance diode configurations on the SNLA SPEED pulse generator at power levels above 1 TW. SPEED is a single module, approx. = 20 nsec FWHM accelerator with a .4 ohm triaxial power flow transmission line in the water section and a doublesided vacuum water insulator at a radius of 53 cm were tested. The dual feed was continued with a triplate disk arrangement down to a diode radius of 4 cm, resulting in a load inductance of 5 nH. The diodes were configured to operate in a Langmuir-Childe's bipolar mode, a paravector potential mode, and a double pinched beam mode. Diode impedance was governed by plasma gap closure. A 4 nsec difference in the arrival time of the waves at the diode from the two feed lines was found to significantly perturb the expected diode performance. Diode performance improved markedly when the two feed lines were isolated from each other. DOE

N84-13466# Argonne National Lab., Ill. Energy and Environmental Systems Div.
ANNOTATED BIBLIOGRAPHY OF BATTERY EVALUATIONS
W. J. Walsh, R. C. Elliott, J. J. Barghusen, and R. O. Mueller Jun. 1983 219 p
(Contract W-31-109-eng-38)
(DE84-000653; ANL/SPG-24) Avail: NTIS HC A10/MF A01

This document is a bibliography of more than 450 publications covering systems studies, comparative evaluations, and assessments of battery technology for the period 1976 to 1982. An annotated commentary summarizing each publication's content and giving perspective is included. The listings are indexed by first author and by electrochemical system. DOE

N84-13467# California Univ., Berkeley. Lawrence Berkeley Lab.
CRYOGENIC TESTING OF THE TPC SUPERCONDUCTING SOLENOID
M. A. Green, R. G. Smits, J. D. Taylor, V. vanSlyke, F. Barrera, H. Petersen, C. E. Rago, R. I. Rinta, D. Talaska, and R. D. Watt Jun. 1983 82 p refs Prepared in cooperation with Stanford Linear Accelerator Center, Calif.
(Contracts DE-AC03-76SF-00098; DE-AC03-76SF-00515)
(DE84-000528; LBL-16217) Avail: NTIS HC A05/MF A01

This report describes the results of a series of tests on the TPC superconducting magnet cryogenic system which occurred during the winter and spring of 1983. The tests occurred at interaction region 2 of the PEP colliding beam facility at the Stanford Linear Accelerator Center (SLAC). The TPC Magnet Cryogenic System which was tested includes the following major components: a remote helium compressor with a full flow liquid nitrogen purification station, 400 meters of high pressure supply and low pressure return lines; and locally a CTi Model 2800 refrigerator with two Sulzer gas bearing turbines, the TPC magnet control dewar, 70 meters of transfer lines, and the TPC thin superconducting solenoid magnet. In addition, there is a conditioner (liquid nitrogen heat exchangers and gas heaters) system for cooldown and warmup of the magnet. This report describes the local cryogenic system and describes the various steps in the cooldown and operation of the TPC magnet. The tests were successful in that they showed that the TPC magnet could be cooled down in 24 hours and the magnet could be operated on the refrigerator or a helium pump with adequate cooling margin. DOE

N84-13468# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Sciences Div.
EVALUATION OF HAMAMATSU R1635 PHOTOMULTIPLIER
C. C. Lo and B. Leskovar May 1983 6 p refs
(Contract DE-AC03-76SF-00098)
(DE84-001252; LBL-16027) Avail: NTIS HC A02/MF A01

Characteristics have been measured of the Hamamatsu R1635 10 mm-diameter photomultiplier. Some typical photomultiplier characteristics - such as gain, dark current, transit and rise times - are compared with data provided by the manufacturer. Photomultiplier characteristics, generally not available from the manufacturer, such as the single photoelectron and pulse response time spread for full photocathode illumination were measured and are discussed. DOE

N84-13469# Argonne National Lab., Ill.
SOLID-OXIDE FUEL CELLS
D. C. Fee and J. P. Ackerman 1983 4 p Presented at the Natl. Fuel Cell Seminar, Orlando, Fla., 13 Nov. 1983
(Contract W-31-109-eng-38)
(DE83-017925; CONF-831104-1) Avail: NTIS HC A02/MF A01

Solid-Oxide Fuel Cell (SOFC) systems offer significant advantages for a variety of fuels and applications. The simplicity and high efficiency of a direct reforming, contaminant-tolerant power system is advantageous for small natural gas or volatile liquid-fueled utility and industrial congeneration plants, as well as residential

use. The further gain in efficiency from the incorporation of a bottoming cycle in large-scale plants is advantageous for coal-fueled utility baseload or industrial cogeneration facilities. Development of SOFC components is well advanced. The present effort focuses on improving cell life and performance as well as integration of cells into an array. DOE

N84-13470# Naval Research Lab., Washington, D. C.
DECOUPLING ION EFFICIENCY FROM IMPEDANCE IN PULSED POWER DIODES Interim Report
R. J. Barker and Shyke A. Goldstein 14 Sep. 1983 59 p refs
(Contract DE-AI08-79DP-40092)
(DE83-018114; AD-A133081; NRL-MR-5184) Avail: NTIS HC A04/MF A01

Classical axis diode theory which links the impedance of a diode to its ion production efficiency is discussed. This linkage stems from the dependence of both impedance and efficiency on the aspect ratio of the given device. This ratio is defined as the cathode outer radius, R, divided by the axial anode-cathode (A-K) gap, D. It is demonstrated that the ion efficiency, eta/sub i/, is strictly proportional only to the typical pathlength, L, of electrons in the A-K gap and that this length need not be related to R. A radial pinch reflex diode geometry is examined in which the anode is a cylindral shell of radius, R + D and of length 2L. The decoupling of eta/sub i/ from Z/sub diode/offers new possibilities for high power/high voltage intense ion beam sources and for high power/low voltage intense electron beam sources. Numerical simulations using the PREMAS diode modeling code are completed for diode geometries which demonstrate both of these applications. DOE

N84-13471# California Univ., Livermore. Lawrence Livermore Lab.
AN FET FULL-BRIDGE SWITCHER FOR INDUCTORLESS CAPACITOR CHARGING FOR NOVA
A. M. Mihalka, R. E. Burch, and B. T. Merritt 1983 5 p refs Presented at the IEEE Power Electron. Spec. Conf., Albuquerque, N. Mex., 6 Jun. 1983
(Contract W-7405-eng-48)
(DE83-018005; UCRL-88671; CONF-830621-43) Avail: NTIS HC A02/MF A01

Switching power supplies which were designed and exceeded the requirements of the Nova 10 mm rod amplifiers are examined. A full bridge with fast recovery diodes is used to improve FET turn off and improve efficiency. The leakage reactance of the transformer effectively limits current so that an inductor is not required. The pulse width is programmable, making them variable frequency power supplies, and may be controlled by a computer or other device for special loads. Higher power can be attained by using heftier transformers and transistors and going to a 480 Vac, Vdc bridge. DOE

N84-13472# Argonne National Lab., Ill. Chemical Technology Div.
APPLICATION FEATURES AND CONSIDERATIONS IN ADVANCED LEAD-ACID AND NICKEL/IRON EV BATTERIES
J. F. Miller, J. S. Rajan, T. S. Lee, C. C. Christianson, F. Hornstra, and N. P. Yao 1983 7 p refs Presented at the Electric Vehicle Council Symp. and EXPO '83, Dearborn, Mich., 4 Oct. 1983
(Contract W-31-109-eng-38)
(DE83-017936; CONF-831020-3) Avail: NTIS HC A02/MF A01

The advanced lead acid and nickel iron EV batteries, and improving specific energy, specific power, cycle life, and cost were emphasized. Other battery characteristics related to application needs are also important features which must be considered during the battery development process. Various application features and improvements incorporated in these advanced lead-acid and nickel iron EV batteries are described. Their volumetric energy density and packaging flexibility are presented: their charge stand capabilities and energy efficiencies are reported, and development work on the safe control of battery off gases and the implementation of single point watering systems is discussed. DOE

N84-13473# Battelle Columbus Labs., Ohio.
ANALYSIS OF LEAD-ACID BATTERY ACCELERATED TESTING DATA Final Report
J. E. Clifford and R. E. Thomas 30 Jun. 1983 36 p refs
(Contract DE-AC04-76DP-00789)
(DE83-017403; SAND-83-7122) Avail: NTIS HC A03/MF A01

Battelle conducted an independent review and analysis of the accelerated test procedures and test data obtained by Exide in the 3 year Phase 1 program to develop advanced lead acid batteries for utility load leveling. Of special importance is the extensive data obtained in deep discharge cycling tests on 60 cells at elevated temperatures over a 2-1/2 year period. The principal uncertainty in estimating cell life relates to projecting cycle life data at elevated temperature to the lower operating temperatures. The accelerated positive grid corrosion test involving continuous overcharge at 500C provided some indication of the degree of grid corrosion that might be tolerable before failure. The accelerated positive material shedding test was not examined in any detail. Recommendations are made for additional studies. DOE

N84-13474# Sandia Labs., Albuquerque, N. Mex.
SUPERREGENERATIVE AMPLIFIER IN LINEAR MODE AS A RADAR RANGE GATE-DERIVATIONS
C. S. Williams Sep. 1983 25 p refs
(Contract DE-AC04-76DP-00789)
(DE84-000978; SAND-82-1425) Avail: NTIS HC A02/MF A01

A formula is derived for the output voltage of a superregenerative amplifier in linear mode when used as a radar range gate. Since the formula is applicable to transients, it can be used to find the gate response to radar-echo pulses at ranges different from the range of maximum gate response. Since radar echo as well as noise and jamming are often random processes. Formulas for the mean-square output when the input is a stationary or transient random process are also presented. DOE

N84-13475# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.
LOW-NOISE GALLIUM-ARSENIDE FIELD-EFFECT TRANSISTOR PREAMPLIFIERS FOR STOCHASTIC BEAM-COOLING SYSTEMS
Branko Leskovar and C. C. Lo Mar. 1983 6 p refs Presented at the Particle Accelerator Conf., Santa Fe, N. Mex., 21-23 Mar. 1983
(Contract DE-AC03-76SF-00098)
(DE83-017535; LBL-15122; CONF-830311-188) Avail: NTIS HC A02/MF A01

The present noise performance, bandwidth capability and gain stability of bipolar and field-effect transistors, parametric amplifier, Schottky diode mixer and maser are summarized and compared in the 100 MHz to 40 CHz frequency range for stochastic beam cooling systems. Stability factor of GaAs FET's as a function of ambient temperature is presented and discussed. Performance data of several low-noise wide-band cryogenically cooled preamplifiers are presented including one with a noise figure of 0.35 dB over a bandwidth range of 150 to 500 MHz operating at ambient temperature of 200K. Also, data are given on a broadband 1 to 2 GHz preamplifier having a noise figure of approximately 0.2 dB. The gain, operating noise temperature, stability, gain nonuniformity and phase-shift as function of frequency of interest for beam cooling systems are discussed. DOE

N84-13476# Brookhaven National Lab., Upton, N. Y.
NEUTRINO-OSCILLATION EXPERIMENTS AT BROOKHAVEN NATIONAL LABORATORY
L. A. Ahrens, S. A. Aronson, P. L. Connolly, B. G. Gibbard, Y. Maeda, M. J. Murtagh, S. J. Murtagh, S. Terada, J. Callas (Brown Univ., Providence, R.I.), and D. Cutts (Brown Univ., Providence, R.I.) 1983 3 p refs Presented at the Intern. Europhys. Conf. on High Energy Phys., Brighton, England, 20-27 Jul. 1983
(Contract DE-AC02-76CH-00016)
(DE83-018275; BNL-33659; CONF-830718-8) Avail: NTIS HC A02/MF A01

Neutrino oscillation searches which are two detector experi-

ments with a close detector at approx. = 100m and a far detector at approx. = 900m are outlined. The details of the experiments are quite different, both groups expect to obtain nu/sub (SIGMA)/ disappearance limits of delta m(2)sin2 theta approx. = 0.1 - 0.2 for small mass difference and sin(2)2 theta at the few percent level for th most sensitive delta m(2) (approx. = 25eV(2)). Both detectors are designed to identify electrons as well as muons and they expect to obtain significant limits on nu/sub e/ appearance (nu/sub (SIGMA)/(FEMALE) nu/sub e/). DOE

N84-13477# Brookhaven National Lab., Upton, N. Y. Div. of Metallurgy and Materials Science.
THE RELATIONSHIP BETWEEN THE MARTENSITIC PHASE TRANSITION AND THE SUPERCONDUCTING PROPERTIES OF A15 COMPOUNDS
D. O. Welch 1983 12 p refs Presented at the Cryogenic Eng. Conf. and Intern Cryogenic Mater. Conf., Colorado Springs, 15 Aug. 1983
(Contract DE-AC02-76CH-00016)
(DE83-018186; BNL-33601; CONF-830841-23) Avail: NTIS HC A02/MF A01

The inhibition of the martensitic phase transition to improve the H/sub c2/ of Nb3Sn was investigated. Current theoretical ideas on the relation between the martensitic and superconducting transitions in A15 compounds are discussed. The experimental evidence on the effect of pressure, alloying additions, and radiation induced disorder on the coupled transitions as well as the related tetragonal strain dependence of the superconducting properties are reviewed. DOE

N84-13478# Los Alamos Scientific Lab., N. Mex.
HIGH-Q PERPENDICULAR-BIASED FERRITE-TUNED CAVITY
Roger D. Carlini, Henry A. Thiessen, and James M. Potter 1983 4 p refs Presented at the 12th Intern. Conf. on High Energy Accelerators, Batavia, Ill., 11-16 Aug. 1983
(Contract W-7405-eng-36)
(DE83-017291; LA-UR-83-2445; CONF-830822-13) Avail: NTIS HC A02/MF A01

Rapid cycling proton synchrotrons, require approximately 10 MV per turn RF with 17% tuning range near 50 MHz. The traditional approach to ferrite tuned cavities uses a ferrite which is longitudinally biased. This method leads to unacceptably high losses in the ferrite. A cavity with transverse bias that makes use of the tensor permeability of the ferrite was developed. It is indicated that in a small quarter wave singly reentrant cavity tuned by nickel-zinc ferrites and aluminum doped garnets the losses in the ferrite can be made negligible compared with the losses due to the surface resistivity of the copper cavity at power levels from 2 to 200 watts. DOE

N84-13479# Westinghouse Research and Development Center, Pittsburgh, Pa.
VOID-FREE EPOXY CASTINGS FOR CRYOGENIC INSULATORS AND SEALS
J. F. Quirk 1983 17 p refs Presented at the Cryog. Eng. Conf. and Intern. Cryog. Mater. Conf., Colorado Springs, 15 Aug. 1983
(Contract W-7405-eng-26)
(DE83-017273; CONF-830841-10) Avail: NTIS HC A02/MF A01

The design of main lead bushing which transmits heat leak loads by conduction to the supercritical helium stream is discussed. The bushing, which consists of epoxy resin cast about a copper conductor, must be electrically insulated, vacuum tight and be capable of withstanding the stresses encountered in cryogenic service. The seal design of the bushing is especially important; leakage from either the helium system or the external environment into the vacuum will cause the magnet to quench. The epoxy resin casting must resist mechanical loads caused by the weight of leads attached to the bushing and thermal stresses transmitted to the epoxy via the conductor. The epoxy resin is cast about the conductor in such a way as to provide the required vacuum tight seal. The technique by which this is accomplished is reviewed. The elimination of voids in the epoxy acts as stress concentrating discontinuities during cooling to or warming from 4K. The types of voids that could be expected and their causes are described. Techniques employed to eliminate voids within the cast resin portion of the bushing are reviewed. DOE

N84-13480# Argonne National Lab., Ill.
MOLTENCARBONATE FUEL CELLS, DEVELOPMENT STATUS
R. Dean Pierce and John P. Ackerman 1983 6 p refs Presented at the Natl. Fuel Cell Seminar, Orlando, Fla., 13 Nov. 1983
(Contract W-31-109-eng-38)
(DE84-000612; CONF-831104-2) Avail: NTIS HC A02/MF A01

The development of stacks of cells leading to the scaleup of components and manufacturing processes for molten carbonate fuel cells is reviewed. Specific topics discussed include a reference power plant design, components and stack designs, plans and fabrication facilities required for prototypes-stack testing, and verification of cell operation on coal derived gas. J.M.S.

N84-13481# Sandia Labs., Albuquerque, N. Mex.
ESD EVALUATION OF RADIATION-HARDENED, HIGH-RELIABILITY CMOS AND MNOS ICS
J. M. Soden, H. D. Stewart, and R. A. Pastorek 1983 13 p refs Presented at the 5th Ann. EOS/ESD Symp., Las Vegas, Nev., 27 Sep. 1983
(Contract DE-AC04-76DP-00789)
(DE84-000138; SAND-83-1045C; CONF-8309162-1) Avail: NTIS HC A02/MF A01

Standard human-body-equivalent circuit electrostatic discharge (ESD) tests were performed on the inputs of high-reliability, radiation-hardened integrated circuits (ICs) designed with seven different technologies. Metal and silicon gate complementary metal oxide semiconductors (CMOS) and metal-nitride-oxide-semiconductor (MNOS) ICs with design rules ranging from 10 microns down to 2 microns were evaluated. The ESD hardness of these ICs ranged from 1 kV to greater than 9 kV. The low-range ESD hardness ICs were fabricated with a masking polysilicon ring that defined the input protection diodes. Tests on commercial equivalent ICs demonstrated that the ESD hardness of the radiation-hardened ICs was not significantly less than the ESD hardness of the commercial equivalent ICs. The failure modes and mechanisms of the ICs were evaluated. Most of the ICs that did not have the making polysilicon ring failed because of input to V sub DD or V sub SS shorts due to degraded protection diodes. ESD tests with the pulse applied between the package metal lid and the package pins were also performed. These lid tests produced permanent input damage, the same as occurred during tests with the pulse applied to the package input, but the damage occurred at lower voltages. ESD pulses with peak voltages as low as 250 volts produced arcs from the lid to the input bond wires, resulting in degraded inputs. DOE

N84-13482# Stanford Linear Accelerator Center, Calif.
IDEAL OF THE PERFECT MAGNET-SUPERCONDUCTING SYSTEMS
H. Shoaee and J. E. Spencer Apr. 1983 8 p refs
(Contract DE-AC03-76SF-00515)
(DE83-015080; SLAC/AP-3) Avail: NTIS HC A02/MF A01

An iron free, superconducting, elliptical coil quadrupole proposed for use in the SLC final focus system was studied. It is shown that such coils might provide a pure quadrupole field ignoring three dimensional effects. Rare earth permanent magnet studies show that these magnets can also be made arbitrarily pure. Similar claims can be made for conventional iron core electromagnets either by demanding pure hyperbolic pole contours or using tricks. The gulf between principle and practice for each type of magnet is considered. Only the superconducting option is outlined because its greater strength, variability, and linearity make it potentially useful for the SLC and the low-beta insertions of the high energy storage rings such as PEP. DOE

N84-13483# Naval Research Lab., Washington, D. C.
THEORETICAL MODELING OF THE PLASMA-EROSION OPENING SWITCH FOR INDUCTIVE-STORAGE APPLICATIONS Interim Report

P. F. Ottinger, S. A. Goldstein, and R. A. Meger 27 Oct. 1983 45 p refs Sponsored in part by the Defense Nuclear Agency
(Contract DE-AI08-79DP-40092)
(DE84-001843; AD-A134041; NRL-MR-5205) Avail: NTIS HC A03/MF A01

A theoretical model for the plasma erosion opening switch (PEOS) which predicts its voltage, current and impedance history as a function of the input waveforms, geometry and switch parameters are presented. Scaling laws for the switch operation are developed from this model. Systems requirements for pulse compression and power multiplication using inductive storage are derived from a simple lumped circuit analysis and a transmission line analysis. These requirements are satisfied using the PEOS as a fast opening, vacuum switch in a configuration relevant for existing high power accelerators. The switch model is incorporated into a transmission line code for comparison with recent inductive storage experiments. DOE

N84-13484# Teledyne Energy Systems, Timonium, Md.
DEVELOPMENT OF ELECTROLYSIS-CELL SEPARATOR FOR 1250C OPERATION. ADVANCED ALKALINE ELECTROLYSIS CELL DEVELOPMENT Final Report
J. N. Murray Mar. 1983 141 p refs Prepared for Brookhaven National Lab.
(Contract DE-AC02-76CH-00016)
(DE84-000439; BNL-51695) Avail: NTIS HC A07/MF A01

A 1250C operating temperature test of the 20 v/o polybenzimidazole (PBI) -80 v/o potassium titanate (K2TiO3) separator in combination with the nickel-molybdenum cathode electrocatalyst system dubbed the C-AN cathode using the ARIES test system was developed. Testing at 1250C proceeded from 745 hr on test until the test was terminated at 2318 operating hours to allow diagnostic disassembly. The input voltage degraded to a value of 1.82 volt per cell at 1250C which is unacceptable. Diagnostic disassembly showed the PBI portion of the separator was no longer present. It was shown that PBI was stable in 1250C, 45 w/o KOH solutions. It is suggested that the attack is attributable to a peroxide or perchlorate type oxidizer which would be unique to the electrolysis mode and probably not present in alkaline fuel cell applications. Recommendations for further testing include an evaluation of the chemical compatibility of PBI with alkaline/oxidizer solutions and endurance testing the C-AN cathode with new improved anode structures at 1250C using asbestos separators in combination with a silicate saturated KOH electrolyte. Demonstration of the stability of this 1.65 volt per cell technology at 500 ma/cm(2) documents is an inexpensive and intelligent hydrogen production process. DOE

N84-13485# Argonne National Lab., Ill. Chemical Technology Div.
SOLUBILITY OF THE NIO FUEL-CELL CATHODE IN LI2CO3 MELTS AS DETERMINED BY CYCLIC VOLTAMMETRY
Thomas D. Kaun 1983 10 p refs Presented at the 4th Electrochem. Soc. Intern. Symp. on Molten Salts, San Francisco, 8 May 1983
(Contract W-31-109-eng-38)
(DE83-014311; CONF-8305100-4) Avail: NTIS HC A02/MF A01

Development of molten carbonate fuel cells is concerned with the stability of its NiO (lithiated) cathode. Observations of metallic-nickel deposits within its electrolyte matrix have prompted investigation into modes of operation to enhance NiO stability as well as a search for alternative cathode materials. In this paper, cyclic voltammetry has been applied to examine Ni(2) concentration in Li2CO3-K2CO3 melts with NiO present. A test cell with three gold electrodes, one being the reference with 1/3 O2 - 2/3 CO2 gas purge, employed voltage limits +0.2 to -1.0 V. Data and physical samples were collected at temperatures between 823 and 1023 K. The Li2CO3-K2CO3 melt compositions ranged from 65 to 38 mol % Li2CO3-K2CO3. Solubility of NiO as a function of increasing temperature (823 to 1023 K) differed for the respective dry carbonate melt compositions, increasing in a range from 5 to 45 wt ppm Ni for 62 mol % Li2CO3, while decreasing in a range from 15 to 5 wt ppm Ni for 38 mol % Li2CO3. In 50 mol % Li2CO3, NiO solubility increased from 10 wt ppm Ni at 823 K to 30 wt ppm Ni at 1023 K. Humidified cathode gas significantly increased NiO solubility (up to 10 X). DOE

N84-13408*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN EPROM-BASED FUNCTION GENERATOR
L. Fowler and J. A. McNeil *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 79-83 (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 09C

N84-13409*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
POLYNOMIAL DRIVEN TIME BASE AND PN GENERATOR
S. S. Brokl *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 84-90 ref (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 09C

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N84-13486 Carnegie-Mellon Univ., Pittsburgh, Pa.
FINITE ELEMENTS AND THE DIVERGENCE CONSTRAINT FOR VISCOUS FLOWS Ph.D. Thesis
James Mathias Boland 1983 84 p
Avail: Univ. Microfilms Order No. DA8314538

Chapter 1 introduces a technique, involving the concept of local div-stability, for analyzing families of velocity/pressure trial spaces. Also, the technique is used to prove that various high order velocity/pressure families are div-stable. Chapter 2 is concerned with the stability of certain families of low order spaces. The popular linear/constant box elements are shown to be unstable to order h and the notion of semistability is developed in an attempt to understand the observed behavior of these elements. In this chapter attention is confined to square grids. Chapter 3 includes additional examples of div-stable velocity/pressure families and an application of the techniques of Chapter 2 to the linear/constant box elements on certain more general grids. Extensions of the type are desirable for interpreting the outputs from practical computer codes, most of which involve other than square regions, and moreover are needed for design of low degree optimal finite element schemes for solving the Navier-Stokes equations in velocity pressure formulation. The subject matter of this chapter will appear in a forthcoming article by the author and R. A. Nicolaides in the SIAM Journal of Numerical Analysis under the title, Stability of finite elements under divergence constraints.
Dissert. Abstr.

N84-13487 State Univ. of New York at Buffalo, Amherst.
MULTIPLE STEADY STATES OF BUOYANCY INDUCED FLOW IN COLD WATER AND THEIR STABILITY Ph.D. Thesis
Ibrahim Mahmoud El-Henawy 1983 115 p
Avail: Univ. Microfilms Order No. DA8312409

The physical background and the literature related to buoyancy-induced flows are reviewed. An accurate representation, based upon experimental data, of the motion-causing buoyancy force, in the vicinity of maximum density in pure water at low temperatures, is used. Using the representation, numerically a model for the laminar, boundary layer flow arising from natural convection adjacent to a vertical isothermal flat surface submerged in quiescent cold water is studied. The results demonstrate for the first time the existence of multiple steady-state solutions in a natural convection flow. The existence of these new multiple steady-state solutions led to an investigation of their stability. Three real

eigenvalue and eigenvector pairs corresponding to the new steady-state-solutions were found. Each of these eigenvalues changes its algebraic sign at a particular limit point (point of vertical tangency, nose, knee) in the bifurcation diagrams. Dissert. Abstr.

N84-13488 California Univ., San Diego.
INVESTIGATION OF THE WALL PRESSURE, WALL SHEAR STRESS AND VELOCITY FIELDS ASSOCIATED WITH A TURBULENT SPOT IN A LAMINAR BOUNDARY LAYER Ph.D. Thesis
Thomas Steven Mautner 1983 242 p
Avail: Univ. Microfilms Order No. DA8312232

The wall pressure field of artificially generated turbulent spots in a laminar boundary layer was investigated. Ensemble averages of the wall pressure signatures, in zero and favorable pressure gradients, show that the spot's pressure signature is characterized by two positive pressure peaks and a central negative pressure region along the centerline which evolves into one negative and one positive pressure perturbation in the wing tip region. For the zero pressure gradient, contours of the ensemble averaged wall pressure measured relative to the laminar value show that the spot produces a leading pressure excess followed by a pressure defect region having its maximum values at the spot's wing tips. The trailing edge consists of a spanwise region of pressure excess also having its maximum value at the wing tips. Dissert. Abstr.

N84-13489 California Inst. of Tech., Pasadena.
EXPERIMENTS ON MIXING AND COMBUSTION WITH LOW HEAT RELEASE IN A TURBULENT SHEAR FLOW Ph.D. Thesis
Mark Godrey Mungal 1983 168 p
Avail: Univ. Microfilms Order No. DA8312058

A new blowdown facility to study mixing and combustion in a turbulent shear layer has been built. The system is capable of 100 m/s for three seconds in a 5 x 20 cm exit area on the high speed side, and 50 m/s in a 10 x 20 cm exit area on the low speed side. Dilute concentrations of hydrogen and fluorine, carried in an inert gas, react when both fluid streams meet at the tip of a splitter plate. The reaction is spontaneous, rapid, and highly exothermic. The resulting temperature field has been studied using a rake of eight fast response thermometers placed across the width of the layer. Runs have been performed for low heat release over a wide range of equivalence (concentration) ratios, at a Reynolds number of 30,800 based on velocity difference and vorticity thickness. The heat release is sufficiently low so that the overall properties of the mixing layer are not significantly changed from the cold case. The results show the presence of large, hot structures within the flow together with cool, irrotational tongues of freestream fluid that penetrate deep into the layer.
Dissert. Abstr.

N84-13490*# Toledo Univ., Ohio. Dept. of Chemical Engineering.
NUMERICAL SIMULATION OF TWO-DIMENSIONAL HEAT TRANSFER IN COMPOSITE BODIES WITH APPLICATION TO DE-ICING OF AIRCRAFT COMPONENTS Ph.D. Thesis. Final Report
David Fu-Kuo Chao Nov. 1983 125 p refs
(Grant NAG3-72)
(NASA-CR-168283; NAS 1.26:168283) Avail: NTIS HC A06/MF A01 CSCL 20D

Transient, numerical simulations of the de-icing of composite aircraft components by electrothermal heating were performed for a two dimensional rectangular geometry. The implicit Crank-Nicolson formulation was used to insure stability of the finite-difference heat conduction equations and the phase change in the ice layer was simulated using the Enthalpy method. The Gauss-Seidel point iterative method was used to solve the system of difference equations. Numerical solutions illustrating de-icer performance for various composite aircraft structures and environmental conditions are presented. Comparisons are made with previous studies. The simulation can also be used to solve a variety of other heat conduction problems involving composite bodies. Author

N84-13491*# Mississippi State Univ., Mississippi State. Dept. of Aerospace Engineering.
A FULLY VECTORIZED NUMERICAL SOLUTION OF THE INCOMPRESSIBLE NAVIER-STOKES EQUATIONS Ph.D. Thesis
Nisheeth Patel Dec. 1983 175 p refs
(Grant NsG-25-001-055)
(NASA-CR-174496; NAS 1.26:174496) Copyright. Avail: NTIS HC A08/MF A01 CSCL 20D

A vectorizable algorithm is presented for the implicit finite difference solution of the incompressible Navier-Stokes equations in general curvilinear coordinates. The unsteady Reynolds averaged Navier-Stokes equations solved are in two dimension and non-conservative primitive variable form. A two-layer algebraic eddy viscosity turbulence model is used to incorporate the effects of turbulence. Two momentum equations and a Poisson pressure equation, which is obtained by taking the divergence of the momentum equations and satisfying the continuity equation, are solved simultaneously at each time step. An elliptic grid generation approach is used to generate a boundary conforming coordinate system about an airfoil. The governing equations are expressed in terms of the curvilinear coordinates and are solved on a uniform rectangular computational domain. A checkerboard SOR, which can effectively utilize the computer architectural concept of vector processing, is used for iterative solution of the governing equations. Author

N84-13492*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMPLEX EIGENVALUES FOR THE STABILITY OF COUETTE FLOW Final Report
R. C. DiPrima and P. Hall Oct. 1983 49 p refs Sponsored in part by United Kingdom SERC and Guggenheim Foundation
(Contract NAS1-17070; Grant NSF MCS-81-20839)
(NASA-CR-172251; NAS 1.26:172251) Avail: NTIS HC A03/MF A01 CSCL 20D

The eigenvalue problem for the linear stability of Couette flow between rotating concentric cylinders to axisymmetric disturbances is considered. It is shown by numerical calculations and by formal perturbation methods that when the outer cylinder is at rest there exist complex eigenvalues corresponding to oscillatory damped disturbances. The structure of the first few eigenvalues in the spectrum is discussed. The results do not contradict the principle of exchange of stabilities, namely, for a fixed axial wavenumber the first mode to become unstable as the speed of the inner cylinder is increased is nonoscillatory as the stability boundary is crossed. M.G.

N84-13493*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EMBEDDED CAVITY DRAG IN STEADY AND UNSTEADY FLOWS Final Report
T. B. Gatski and C. E. Grosch (Old Dominion Univ.) Dec. 1983 35 p refs
(Contract NAS1-17130)
(NASA-CR-172275; ICASE-83-65; NAS 1.26:172275) Avail: NTIS HC A03/MF A01 CSCL 20D

The numerical solution of the laminar boundary-layer flow over an embedded cavity is studied. The purpose is to examine the relevant drag characteristics of laminar cavity flow. The solution field is obtained in terms of velocity and vorticity variables, with the stream function and pressure derivable from the directly computed variables. An analysis and comparison is made among four square cavities, ranging in size from 0.25 to 1.00 boundary-layer thicknesses deep. The dominant flow features are examined in the vicinity of the cavity by means of the stream function and iso-vorticity contours. The dominant physics in the overall drag characteristics of the flow is examined by an analysis of the pressure and wall shear stress distributions in the cavity, and upstream and downstream of the cavity. Pressure forces and

frictional forces in, and in the vicinity of, the cavity are determined. Stress relaxation distances, both upstream and downstream of the cavity, are calculated and analyzed. The flow dynamics of the boundary-layer flow over an embedded cavity is summarized. Finally, the relevance of the results to the control of flow separation in such flows is discussed. M.G.

N84-13494*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPUTATION OF VISCOUS FLOW IN CURVED DUCTS AND COMPARISON WITH EXPERIMENTAL DATA
Charles E. Towne Dec. 1983 22 p refs Presented at the 21st Aerospace Sci. Conf., Reno, Nev., 9-12 Jan. 1984
(NASA-TM-83548; NAS 1.15:83548; AIAA-84-0531; E-1922) Avail: NTIS HC A02/MF A01 CSCL 20D

A three dimensional analysis for fully viscous subsonic internal flow is evaluated. The analysis, designated PEPSIG, solves an approximate form of the Navier-Stokes equations by an implicit spatial marching procedure. Results of calculations are presented for laminar flow through two different circular cross-sectioned 180 degree bends, and for laminar and turbulent flow through circular and square cross-sectioned 22.5 to 22.5 degree S-ducts. Quantitative comparisons with experimental data are shown for all cases. Special emphasis is placed on verifying the ability of the analysis to accurately predict the distorted flow fields resulting from pressure-driven secondary flows. Author

N84-13495# National Aerospace Lab., Tokyo (Japan).
NEW RELATIONSHIPS FOR TURBULENT PLUMES
Hiroshi Ishigaki 1983 9 p refs In JAPANESE; ENGLISH summary
(NAL-TR-763; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

All turbulent jets eventually become buoyancy-dominated plumes far away from the origin, even if they have very large initial momentum flux. Relationships between velocity and temperature for vertical turbulent plumes in quiescent fluid are derived. These in effect give the local Richardson number of plane and round plumes. The relationships are in good agreement with the experimental data. S.C.L.

N84-13496# National Research Inst. for Oceanology, Stellenbosch (South Africa). Coastal Engineering and Hydraulics Div.
THE NATURE AND ANALYSIS OF RANDOM WAVES IN SHALLOW WATER. PART 1: TEXT AND FIGURES
D. H. Swart Mar. 1983 91 p refs 2 Vol.
(CSIR-RR-388/1-Pt-1) Avail: NTIS HC A05/MF A01

It is assumed that in deep water the random wave surface is built up of an infinite number of independent sinusoidal components and can therefore be represented by a Fourier series. The wave surface described is Gaussian, which means that the water elevations measured relative to the mean water level are normally distributed if sampled at constant intervals of time. At the same time the wave heights are Rayleigh distributed. S.C.L.

N84-13497# National Research Inst. for Oceanology, Stellenbosch (South Africa). Coastal Engineering and Hydraulics Div.
THE NATURE AND ANALYSIS OF RANDOM WAVES IN SHALLOW WATER. PART 2: APPENDICES
D. H. Swart Mar. 1983 226 p 2 Vol.
(CSIR-RR-388/2-Pt-2) Avail: NTIS HC A11/MF A01

The wave properties as predicted by vocoidal wave theory are given and the algebraic expression for the Fourier expansion of the vocoidal wave profile is included. A flow diagram and computer program for the analysis of shallow water waves and a higher order wave analysis for 175 selected sets of boundary conditions are presented. S.L.

N84-13498# National Mechanical Engineering Research Inst., Pretoria (South Africa).
HYDRAULIC HOISTING AND BACKFILLING
H. B. Sauermann 1982 42 p refs Presented at the Hydraulic Transport of Solids in Pipes Conf., Johannesburg, 23-24 Aug. 1982
(CSIR-ME-452) Avail: NTIS HC A03/MF A01

In a country such as South Africa, with its large deep level mining industry, improvements in mining and hoisting techniques could result in substantial savings. Hoisting techniques, for example, may be improved by the introduction of hydraulic hoisting. The following are some of the advantages of hydraulic hoisting as against conventional skip hoisting: (1) smaller shafts are required because the pipes to hoist the same quantity of ore hydraulically require less space in the shaft than does skip hoisting equipment; (2) the hoisting capacity of a mine can easily be increased without the necessity of sinking new shafts. Large savings in capital costs can thus be made; (3) fully automatic control is possible with hydraulic hoisting and therefore less manpower is required; and (4) health and safety conditions will be improved. S.L.

N84-13499# Technion - Israel Inst. of Tech., Haifa. Dept. of Agricultural Engineering.
ON THE EFFECT OF GYROSCOPIC FORCES ON THE INSTABILITY OF CERTAIN FLUID-ELASTIC SYSTEMS. PART 1: DEFINITIONS
Aleksander Kornecki Sep. 1983 53 p refs
(Publ-340; ISSN-0333-5897) Avail: NTIS HC A04/MF A01

This study was motivated by work on the stability of nonconservative elastic systems and flutter of certain fluid-elastic systems. A literature review revealed that the concepts of conservative forces (and systems) and gyroscopic forces (and systems) need clarifications, and the definitions formulated by different authors for the forces and systems are sometimes conflicting. In this report, these controversies are thoroughly discussed and conservative and gyroscopic systems are redefined within the framework of the classical dynamics of a system of particles. Author

N84-13500*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE DISTURBANCE FLOW FIELD PRODUCED BY AN EVOLVING VORTEX
T. B. Gatski Dec. 1983 35 p refs
(NASA-TP-2245; L-15670; NAS 1.60:2245) Avail: NTIS HC A03/MF A01 CSCL 20D

The flow field of a vortex in a viscous shear flow is found by constructing a uniformly valid asymptotic expansion consisting of an inner solution field represented, to lowest order, by a two dimensional, nonliner, inviscid Stuart vortex and an outer solution field represented, to lowest order, by either a two dimensional parallel or self similar viscous flow. The technique involves scaling both the transverse and streamwise coordinates in the vicinity of the vortex as well as allowing for a slow variation of the outer viscous flow. Criteria are established for both the size of the vortical structure and proximity to the boundary surfaces. The composite solution is a consistent mathematical picture of the flow field at a fixed streamwise location as the vortical structure evolves past this point. Such a formulation is also useful in the specification of boundary or initial conditions in numerical fluid dynamic calculations, where an inconsistent setting of these conditions leads to spurious results for rather long computation times. Author

N84-13501*# Grumman Aerospace Corp., Bethpage, N.Y.
ENHANCEMENT OF THE CAVE COMPUTER CODE
Kenneth A. Rathjen and Henry O. Burk Washington NASA Dec. 1983 85 p refs
(Contract NAS1-15367)
(NASA-CR-3731; NAS 1.26:3731) Avail: NTIS HC A05/MF A01 CSCL 20D

The computer code CAVE (Conduction Analysis via Eigenvalues) is a convenient and efficient computer code for predicting two dimensional temperature histories within thermal protection systems for hypersonic vehicles. The capabilities of CAVE were enhanced by incorporation of the following features into the code: real gas effects in the aerodynamic heating predictions, geometry and aerodynamic heating package for analyses of cone shaped bodies, input option to change from laminar to turbulent heating predictions on leading edges, modification to account for reduc-

tion in adiabatic wall temperature with increase in leading sweep, geometry package for two dimensional scramjet engine sidewall, with an option for heat transfer to external and internal surfaces, print out modification to provide tables of select temperatures for plotting and storage, and modifications to the radiation calculation procedure to eliminate temperature oscillations induced by high heating rates. These new features are described. Author

N84-13502# Overseas Relations Branch Translation Service, London (England).
TEMPERATURE RISE OF HANDLES AND KNOBS
E. F. Maximilian vanderHeld 13 Sep. 1983 11 p Transl. into ENGLISH from Elek. (West Germany), v. 9, no. 2, 1939 p 31-34 (BLL-OA-Trans-3047-(6196.3)) Avail: NTIS HC A02/MF A01

At present no regulations exist for the handles and knobs of the controls and switches on electric ovens or hot plates. No means exist to prevent the controls from taking up a high temperature during the normal use of the appliances. Therefore the Heat Institute prepared a procedure for determining the highest permissible temperature of switches, handles and knobs fitted on hot appliances. B.G.

N84-13503# Overseas Relations Branch Translation Service, London (England).
RADIAL THERMOMECHANICAL BEHAVIOUR
C. Bayard, P. Bourjot, and J. J. Cottart 23 Sep. 1983 12 p refs Transl. into ENGLISH of conf. paper no. 7 presented at the S.E.E. Section 12 Conf., 1983 12 p Conf. held in Gif-Sur-Yvette, France, 2 Jun. 1983
(BLL-OA-Trans-2639-(6196.3)) Avail: NTIS HC A02/MF A01

The external core screen of the MV network cable contains lengthwise grooves. One of the reasons for the existence of these grooves is to provide an elastic bedding effect making it possible to absorb part of the expansion of the insulation, particularly when overloaded, which contributes to improving the radial thermo-mechanical behavior of the cable. Numerous thermal cycle tests were done on the different components and on the complete cable, either in the form of short samples in an oven, or on samples several meters long heated by the circulation of current in the conductor. The 'conductor, insulation and core screens ensemble' is homogeneous and its radial expansions are reversible. These bring about a residual deformation of the aluminum screen/PVC ensemble leading to an increase in the diameter and a reduction in the overlapping width of the aluminum screen perceptible especially above 120 C conductor temperature. The slackness effect thus created at high temperature may lead to a loss of the lengthwise water tightness of the cable. S.C.L.

N84-13504# Naval Postgraduate School, Monterey, Calif.
AN EXPERIMENTAL EVALUATION OF THE THERMAL PERFORMANCE OF A ROTATING HEAT PIPE WITH INTERNAL AXIAL FINS M.S. Thesis
George H. Gardner, III Jun. 1983 67 p
(AD-A132553) Avail: NTIS HC A04/MF A01 CSCL 13/1

A rotating heat pipe was tested using two different copper condensers (a smooth cylinder and a cylinder with 22 straight axial fins) and water as the working fluid. The smooth condenser was tested at rotational speeds of 700, 1400 and 2800 RPM. The finned condenser was tested at 700 RPM. The heat transfer rate for each run was measured and plotted against the temperature difference between the internal vapor and the cooling water inlet. Representative condenser wall temperature profiles were plotted for each run. The primary objectives was to compare the heat transfer rates obtained. The finned condenser heat transfer rates were 30-40 percent greater than those of the smooth condenser. All data appeared to be influenced by the presence of noncondensable gases. Recommendations for improvements to the rotating heat pipe system are included. GRA

N84-13505# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Environmental Lab.
ENVIRONMENTAL IMPACT RESEARCH PROGRAM. TWO-EQUATION, DEPTH-INTEGRATED TURBULENCE CLOSURE FOR MODELING GEOMETRY-DOMINATED FLOWS Final Report
Raymond S. Chapman Jun. 1983 27 p
(AD-A132347; WES/MP/EL-83-3) Avail: NTIS HC A03/MF A01 CSCL 20/4

The state of the art of nearfield hydrodynamic modeling has recently evolved to a point where the use of simple eddy viscosity/diffusivity closure models may no longer be satisfactory. In this report, a new and much improved method for addressing the turbulent transport mechanism in depth integrated hydrodynamic models is presented. In addition, results of steady state model simulations utilizing k-e closure are presented along with specific recommendations for future model improvement. Author (GRA)

N84-13506# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.
MEASUREMENT OF VELOCITY DISTRIBUTIONS IN TURBULENT JETS USING A LASER DOPPLER VELOCIMETER M.S. Thesis
Mark Donald Weesman Jun. 1983 145 p
(AD-A132316) Avail: NTIS HC A07/MF A01 CSCL 20/4

The theory of operation of Laser Doppler Velocimeters is discussed for both reference beam and differential Doppler modes. Current entrainment models for velocity distributions in vertical axisymmetric turbulent buoyant jets in a quiescent ambient are reviewed. A specific Laser Doppler Velocimeter is used to measure the velocity distribution found in a vertical, axisymmetric turbulent jet discharge into a quiescent ambient and the results are compared to theory. Author (GRA)

N84-13507# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
TURBULENT WALL PRESSURE SIMULATION Final Report, Jul. 1982 - Jun. 1983
Robert L. Ash and Mehdi R. Khorrami Jul. 1983 85 p
(Contract N00014-82-K-0639; NR Proj. 657-694)
(AD-A132297) Avail: NTIS HC A05/MF A01 CSCL 20/4

The root mean square pressure was calculated with synthetically generated pressure signals for transducers of different size. The transducer diameters were in the range of $0.02 < d < 1.16$ at a Reynolds number of 12,250. The lower limit of the diameter simulated here was much smaller than diameters reported previously by other workers. Calculated root mean square pressure levels developed in the present work were in good agreement with the measured experimental data. In order to check the simulated pressure signals, the power spectrum and two point correlation were calculated as well. The power spectra obtained with the smaller transducers were higher in energy level at high frequencies. The shape of the power spectra were similar and overall agreement with experimental data was reasonable. The two point correlations were obtained for separation distances of 1.66, and 13.37. The same convection and decay effects as the experimental data were observed with the calculated correlations. Again, overall agreement with experimental result was quite good. GRA

N84-13508# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.
CONDENSATION HEAT TRANSFER OF STEAM ON A SINGLE HORIZONTAL TUBE M.S. Thesis
Kenneth A. Graber Jun. 1983 83 p
(AD-A132245) Avail: NTIS HC A05/MF A01 CSCL 13/1

An experimental apparatus was designed, constructed and instrumented in an effort to systematically and carefully study the condensation heat-transfer coefficient on a single, horizontal tube. A smooth, thick-walled copper tube of length 133.5 mm, with an outside diameter of 15.9 mm and an inside diameter of 12.7 mm was instrumented with six wall thermocouples. The temperature rise across the test section was measured accurately using quartz crystal thermometers. The inside heat-transfer coefficient was determined using the Sieder-Tate correlation with leading coefficient

of 0.029. Initial steam side data were taken at atmospheric pressure to test the data acquisition/reduction computer programs. GRA

N84-13509# Naval Postgraduate School, Monterey, Calif.
AN ANALYSIS OF SMOOTH AND AXIALLY FINNED, ROTATING HEAT PIPE CONDENSERS M.S. Thesis
Adam F. Kleinholz Jun. 1983 177 p
(AD-A132141; AD-E850405) Avail: NTIS HC A09/MF A01 CSCL 12/1

A mathematical model is developed to determine the heat transfer rate of a cylindrical condenser section of a rotating heat pipe. This model is coupled to an existing code and an analysis is accomplished on both a smooth and axially finned condenser. The results of this analysis are compared to those of a similar analysis performed on a tapered condenser heat pipe using identical geometric and operating parameters. Results of the comparison indicate cylindrical condensers have a lower heat transfer rate than equivalent tapered condensers. This reduction in heat transfer rate is due to a greater condensate film thickness and is most significant in a smooth condenser. Axially finned condensers with triangular and rectangular fin profiles are also compared. The rectangular fins are assumed to have adiabatic tips. Results indicate the heat transfer rates for these two profiles vary by only 0.40 % for both tapered and cylindrical condenser.
Author (GRA)

N84-13510# Naval Research Lab., Washington, D. C. Fluid Dynamics Branch.
PSEUDOSPECTRAL SOLUTION OF INVISCID FLOWS WITH MULTIPLE DISCONTINUITIES Interim Report
L. Sakell 17 Aug. 1983 52 p
(RR021054B)
(AD-A132084; NRL-MR-5147) Avail: NTIS HC A04/MF A01 CSCL 20/4

The author has shown that a pseudospectral technique may be coupled with fourth-order artificial viscosity and spectral filtering to solve inviscid flow fields in which a single discontinuity is present. The flow fields treated in this manner have been both one and two dimensional in character; the former consisting of a shock wave propagating in the coordinate direction and the latter a supersonic wedge flow. This report presents results using that same combination of smoothing techniques applied to flows where multiple discontinuities arise. The full inviscid equations of motion (Euler equations), cast in conservation law form, are used together with an Adams-Bashforth time differencing algorithm. Two classes of time dependent multiple discontinuity inviscid flows are solved: (1) a bursting diaphragm problem, in which a shock wave and contact surface discontinuity are simultaneously present, but neither have yet reached a boundary, and (2) the flowfield which arises when two normal shock waves of unequal strengths, traveling towards each other, collide and give rise to two shock waves of new and different strengths along with a contact surface discontinuity. GRA

N84-13511# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
METHOD OF OPERATOR SPLITTING OR FRACTIONAL STEPS AND ITS APPLICATIONS TO FLUID-DYNAMIC MODELLING
R. A. Berry Sep. 1983 31 p refs
(Contract DE-AC07-76ID-01570)
(DE84-000800; EGG-SAAM-6398) Avail: NTIS HC A03/MF A01

The basic method of operator splitting or the fractional step method is explained in tutorial fashion. Simple applications are given to illustrate the versatility of the method. The applications are representations of the type of terms which could be encountered in complicated fluid dynamic problems, notably, the equations of chemically reacting flow or multiphase flow. While these methods are applicable to current modelling efforts on current generation SISD (single instruction stream, single data stream) computers, they appear to have a potentially greater application on vector SIMD (single instruction stream, multiple instruction stream) computers and parallel processor MIMD (multiple instruction stream, multiple data stream) computers. DOE

N84-13512# California Univ., Livermore. Lawrence Livermore Lab.
FURTHER STUDIES ON EQUAL-ORDER INTERPOLATION FOR NAVIER-STOKES
P. M. Gresho, R. L. Lee, and R. L. Sani (Colorado Univ., Boulder) Oct. 1983 7 p refs Presented at the 5th Finite Element Methods in Flow Probl., Austin, Texas, 23-26 Jan. 1983
(Contract W-7405-eng-48)
(DE84-000916; UCRL-89094; CONF-830149-2) Avail: NTIS HC A02/MF A01

The simplest quadrilateral element available for the incompressible Navier-Stokes equations is the mixed interpolation 4-node element with bilinear velocity and (piecewise) constant pressure - donoted herein by 4/1. The next simplest is the 4/4 element, in which (continuous) bilinear approximation is also employed for pressure - i.e., the simplest case of equal-order interpolation. The 4/1 element has been very popular, even though it sometimes generates one spurious pressure mode which is usually filterable. But the 4/1 element generates a poor approximation to (Del P) when distorted elements are employed (via the bilinear isoparamatic technique), which often leads to large errors in velocity; e.g. this element generated wrong answers for vortex shedding on the same mesh for which a higher order element (9/4:) performed well. Although the 4/4 element generates ostensibly useless pressures, the pressure gradient and the velocity field might be much more accurate than those from the 4/1 element, especially when distorted meshes are employed. Based on these observations, the 4/4 element was tested on two problems, for which the 4/1 element failed. The 4/4 element is no panacea, however; the multiple (and generally unknown) spurious pressure modes (pure and impure) associated with equal-order interpolation leads to a generally delicate solution procedure. A viable technique for recovering a useful pressure field from the otherwise polluted pressures is presented. DOE

N84-13513# Battelle Columbus Labs., Ohio.
MODELS OF SIMULTANEOUS HEAT AND MOISTURE TRANSFER IN SOILS
Robert D. Fischer Oct. 1983 35 p refs Prepared for ORNL, Tenn.
(Contract W-7405-eng-26)
(DE84-001580; ORNL/SUB-80-7800-1) Avail: NTIS HC A03/MF A01

Moisture migration in soils due to thermal effects is a phenomenon of interest to designers of ground-coupled heat-pump systems because of the concern about moisture migration away from buried pipes during cooling operation. Such moisture migration should have deleterious effects on heat transfer capabilities of the soil and, consequently, overall performance of the ground-coupled heat-pump system. A number of models for simultaneous heat and moisture transfer in soils have been identified; but, these models all have their origins in disciplines other than around-coupled heat pumps. These models are evaluated for application in modeling the performance of ground coupling during cooling operation. Two models are identified which may hold promise for modeling heat and moisture transfer in soils adjacent to horizontal ground coils of a ground-coupled heat pump during cooling operation. Recommendations are given as to the data and development that may be needed to bring these models to operational status for this particular application. DOE

N84-13514# Dynamics Technology, Inc., Torrance, Calif.
COMPUTATION OF TURBULENT REACTING FLOWS: COMPARISON OF VARIOUS MIXING/CHEMISTRY INTERACTION MODELS
John J. Wormeck Sep. 1983 202 p refs
(Contract DE-AC03-81ER-10964)
(DE84-000998; DOE/ER-10964/T2) Avail: NTIS HC A10/MF A01

This report compares various mixing/chemistry interaction models for turbulent combustion. Four different models are considered, three of which were developed previously: (1) chemical equilibrium model; (2) finite rate chemistry model using mean

values; and (3) probability density function (PDF) approach with infinite rate chemistry. The fourth method is called the contact index model, in which the turbulent chemistry correlations are modeled by PDF and then solved in the finite rate chemistry formulation of model (2). The chemistry correlations result from Reynolds decomposing the thermochemical equations and can be combined into a contact index for each reaction. All of these combustion models are fully coupled to existing two dimensional hydrodynamic codes, including steady and unsteady full Navier-Stokes equations and boundary layer equations. Results are compared to experiment for various types of reacting flows. DOE

N84-13515# Sandia Labs., Albuquerque, N. Mex. Thermophysical Properties Div.

USE OF NUMERICAL HEAT-TRANSFER TECHNIQUES TO ANALYZE THERMAL-COMPARATOR CONDUCTIVITY MEASUREMENTS

James N. Sweet, Marvin Moss, and Carlton E. Sisson 1983 39 p refs Presented at the 18th Intern. Thermal Conductivity Conf., Rapid City, S.D., 3 Oct. 1983

(Contract DE-AC04-76DP-00789)

(DE84-000945; SAND-83-2109C; CONF-8310163-3) Avail: NTIS HC A03/MF A01

The thermal conductivity of solid samples with conductivities in the range approx. = .2 to 50 W/m-K, is frequently measured by the comparative or cut bar method. In this technique, the specimen under test is sandwiched between two similarly sized reference materials of known conductivity which act as heat flux gages. An axial heat flow is established by means of heaters at the top and bottom of the reference sample reference stack. The thermal conductivity of the sample is then calculated from the measured temperature gradients across the references and the sample, with the implicit assumption that the axial heat flux is uniform throughout the stack. A detailed numerical heat transfer analysis of the commercially available Dynatech TCFM comparator was made with the aid of a finite difference numerical heat transfer code (SINDA). The effect of nonuniform axial heat flux on the measured conductivity was determined and the magnitude of the errors likely to be observed in various experimental situations was defined. DOE

N84-13516# Los Alamos Scientific Lab., N. Mex.

VAPOR-PHASE HEAT-TRANSPORT SYSTEM

James C. Hedstrom 1983 7 p refs Presented at the Passive and Hybrid Solar Energy Update Meeting, Washington, D.C., 26-28 Sep. 1983

(Contract W-7405-eng-36)

(DE84-001341; LA-UR-83-2646; CONF-830980-3) Avail: NTIS HC A02/MF A01

A vapor-phase heat-transport system is being tested in one of the passive test cells at Los Alamos. The system consists of one selective-surface collector and a condenser inside a water storage tank. The refrigerant, R-11, can be returned to the collector by gravity or with a pump. Results from several operating configurations are presented, together with a comparison with other passive systems. A new self-pumping concept is presented. DOE

N84-13517# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.

CALCULATION OF NATURAL CONVECTION WITHIN A HEATED ENCLOSURE USING THE METHOD OF SECOND MOMENTS

Darrell W. Pepper 13 Nov. 1983 15 p refs Presented at the ASME Winter Ann. Meeting, Boston, 13-18 Nov. 1983

(Contract DE-AC09-76SR-00001)

(DE84-001596; DP-MS-83-5; CONF-831111-2) Avail: NTIS HC A02/MF A01

The method of second moments is a quasi-Lagrangian, explicit numerical method which calculates the advection of a variable without numerical dispersion, damping, or phase error. The technique is particularly attractive for calculating temperatures and other scalar transport equations, and has been used primarily for environmental modeling. Application of the technique to free convection studies indicates that the method can also be adapted to calculate the transport of vorticity for low to moderate Rayleigh numbers. In fact, transport equations of the form similar to the vorticity equation can be solved with the technique, providing the equation can be quasi-linearized. Use of the technique for calculating highly nonlinear equations (e.g., shock fronts) can become troublesome. Instability can result in nonlinear self advection problems as a result of high wave number amplification and nonconservation of the integral relations. DOE

N84-13518# Argonne National Lab., Ill. Components Technology Div.

COMPUTATIONS OF TURBULENT RECIRCULATING FLOWS WITH FULLY COUPLED SOLUTION OF MOMENTUM AND CONTINUITY EQUATIONS

S. P. Vanka Aug. 1983 68 p refs Sponsored in part by the Ramjet Technology Div. of Wright-Patterson AFB, Ohio

(Contract W-31-109-eng-38)

(DE84-001529; ANL-83-74) Avail: NTIS HC A04/MF A01

A fully coupled solution algorithm for pressure linked fluid flow equations earlier found to be convergent in laminar flows has been extended to calculate turbulent flows. The governing mean flow equations are solved in conjunction with a two equation (K - epsilon) turbulence model. A number of two dimensional recirculating flows have been computed and it is shown that the calculation procedure is rapidly convergent in all the cases. The calculations have been compared with published experimental data; their agreement is in accord with other published experiences with the (K - epsilon) model in similar flows. DOE

N84-13519# Oak Ridge National Lab., Tenn. Energy Div.

OAK RIDGE HEAT-PUMP MODELS. PART 1. A STEADY-STATE COMPUTER DESIGN MODEL FOR AIR-TO-AIR HEAT PUMPS

S. K. Fischer and C. K. Rice Aug. 1983 186 p refs

(Contract W-7405-eng-26)

(DE84-001577; ORNL/CON-80/R1) Avail: NTIS HC A09/MF A01

The ORNL Heat Pump Design Model is a FORTRAN-4 computer program to predict the steady state performance of conventional, vapor compression, electrically driven, air to air heat pumps in both heating and cooling modes. This model is intended to serve as an analytical design tool for use by heat pump manufacturers, consulting engineers, research institutions, and universities in studies directed toward the improvement of heat pump performance. The Heat Pump Design Model allows the user to specify: system operating conditions, compressor characteristics, refrigerant flow control devices, fin and tube heat exchanger parameters, fan and indoor duct characteristics, and any of ten refrigerants. The model will compute: system capacity and COP (or EER), compressor and fan motor power consumptions, coil outlet air dry and wet bulb temperatures, air and refrigerant side pressure drops, a summary of the refrigerant side states throughout the cycle, and overall compressor efficiencies and heat exchanger effectiveness. Thorough documentation of how to use and/or modify the model is provided. DOE

N84-13520# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.

HEAT TRANSFER TO SUBCOOLED HE 1

S. Caspi Jul. 1983 10 p refs Presented at the Cryogenic Eng. Conf. and Intern. Cryogenic Mater. Conf., Colorado Springs, 15-19 Aug. 1983

(Contract DE-AC03-76SF-00098)

(DE83-017767; LBL-15751; CONF-830841-19) Avail: NTIS HC A02/MF A01

Heat transfer into subcooled He-1, was studied by a copper block with an embedded heater. The block's temperature was measured and the characteristic boiling curves were recorded. The measurement accuracy of heater power and block temperature was sufficient to record the convection region prior to nucleate boiling. It is recommended that the effective size of the pool in the apparatus can be restricted by introducing an adiabatic wall parallel to and a fixed distance from the heated surface. Free convection heat transfer, limiting heat flux to subcooled He-1, and geometry effects are reported. DOE

N84-13521# Tennessee Univ., Knoxville. Mechanical and Aerospace Engineering.
AN ANALYSIS OF THE INTERACTION BETWEEN A SUBMERGED JET AND A RECEIVER-DIFFUSER IN A REVERSE-FLOW DIVERTER
G. V. Smith and R. M. Counce (ORNL) 1983 5 p refs Presented at the 2nd International Association of Science and Technology for Development Symp., San Francisco, 16-18 May 1983
(Contract W-7405-eng-26)
(DE83-012593; CONF-830558-1) Avail: NTIS HC A02/MF A01

Two mathematical models of the interaction between a submerged jet emanating from the nozzle of a reverse flow diverter (RFD) and a receiver diffuser of a venturi like reverse flow diverter are presented. Both models predict the output characteristics fairly accurately, although the experimentally measured flow is observed to saturate at higher values of jet dynamic pressure and at lower values of output load impedances. The inviscid flow model indicates cavitation as the likely cause of the flow saturation. DOE

N84-13522# Sandia Labs., Albuquerque, N. Mex. Fluid and Thermal Sciences Dept.
CONSTRUCTION AND VERIFICATION OF A FINITE-ELEMENT METHOD FOR NONISOTHERMAL FLOWS IN POROUS MEDIA
David K. Gartling and Daniel C. Reda 1983 15 p refs Presented at the Computational Eng. Mech. Conf., Dalian, China, 4 Sep. 1983
(Contract DE-AC04-76DP-00789)
(DE83-017158; CONF-8309135-2; SAND-83-1844C) Avail: NTIS HC A02/MF A01

A Galerkin-based, finite element method is developed for numerically simulating nonisothermal flows in porous materials. The partial differential equations describing heat and mass transfer in a rigid porous matrix are described. Use of the finite element method to produce a computational procedure is outlined and solution procedures for the finite element equations are discussed. An experiment involving mixed free and forced convection is used to verify the accuracy of the numerical procedure. DOE

N84-13523# Texas Univ., Austin.
FINITE-ELEMENT ANALYSIS OF INCOMPRESSIBLE LAMINAR AND TURBULENT FLOW WITH HEAT TRANSFER
G. F. Polansky, J. P. Lamb, and D. E. Klein 1983 6 p refs Presented at 5th Finite Element Methods in Flow Probl., Austin, Tex., 23 Jan. 1983
(Contract DE-AC04-76DP-00789)
(DE84-000042; SAND-83-1043C; CONF-830149-1) Avail: NTIS HC A02/MF A01

The finite-element method is investigated as a means of simulating incompressible, laminar, and turbulent flow past a confined backward facing step. Flow-field and heat-transfer results are compared with available experimental data and other computational results. DOE

N84-13524# Rice Univ., Houston, Tex. Dept. of Chemical Engineering.
PREDICTION OF MULTICOMPONENT LIQUID-MIXTURE VISCOSITY FROM BINARY THERMODYNAMIC DATA
I. C. Wei and R. L. Rowley 1983 17 p refs Presented at ASME Winter Ann. Meeting, Boston, 13 Nov. 1983
(Contract DE-AS05-82ER-13008)
(DE83-011934; DOE/ER-13008/2; CONF-831111-1) Avail: NTIS HC A02/MF A01

A local composition model for multicomponent, nonaqueous, liquid mixture shear viscosity was developed and tested. Only binary equilibrium thermodynamic information is required in addition to pure component data; no mixture viscosity data and no adjustable parameters are used. Predictions were compared to experimental data obtained from the literature and in the laboratory yielding an average absolute percent deviation of 1.1% for ln(eta v) for 47 binary systems consisting of 391 points over the entire composition range and 0.75% for seven ternary systems consisting of 63 data points. DOE

N84-13525# Kanner (Leo) Associates, Redwood City, Calif.
EQUATIONS GOVERNING THE LIQUID-FILM FLOW OVER A PLANE WITH HEAT FLUX AND INTERFACIAL PHASE CHANGE
Bertrand Spindler 1983 158 p refs Transl. into ENGLISH of "Equations Governant l'Ecoulement Plan D'Un Film Liquide Avec Flux de Chaleur a la Paroi et Changement de Phase a l'Interface" Rept. CEA-R-5061 CEA, (France), Grenoble Prepared for Los Alamos Scientific Lab., N. Mex.
(Contract W-7405-eng-36)
(DE83-017528; LA-tr-83-14; CEA-R-5061) Avail: NTIS HC A08/MF A01

The purpose of the study is to find a system of equations which can be used to study the linear stability of a liquid film flow over a plane exhibiting wall heat flux and interfacial phase change. The flow of such a film is governed by four groups of equations: the equations for mass balance, momentum and energy in the liquid; equations for the balance in the steam; equations for the balance at the liquid-steam interface; and the boundary conditions. Two flow patterns are considered - flow with upstream film and film condensation. Stability is studied by perturbation methods. DOE

N84-13526# Allied Chemical Corp., Morristown, N.J.
DEVELOPMENT OF A RESIDENTIAL GAS-ABSORPTION HEAT PUMP
Kevin P. Murphy and Benjamin A. Phillips (Phillips Engineering Co.) 1983 5 p Presented at the 18th Intersoc. Energy Conversion Eng. Conf., Orlando, Fla., 21 Aug. 1983
(Contract W-7405-eng-26)
(DE83-017218; CONF-830812-48) Avail: NTIS HC A02/MF A01

A residential sized absorption heat pump was developed using organic absorption pairs and several different absorption pairs were examined. The R123a (CC1F2CHC1F) was discussed as the refrigerant and ETFE (ethyltetrahydrofurfurylether) as the absorbent. This pair was good overall physical properties and performance equal to present commercial pairs. The R123a/ETFE pair will give a projected heating COP of 1.50 with a condensing flue system. The feasibility of the organic pairs was demonstrated in general. Combined operational experience of over 36,000 hours on these types of system has been reached with a maximum of 13,000 hours on any single unit. It was found that the thermal stability of the absorption fluids is quite acceptable. A new solution pump design was developed for use with the organic pairs. DOE

N84-13527# Argonne National Lab., Ill. Components Technology Div.
FULLY-COUPLED SOLUTION OF PRESSURE-LINKED FLUID FLOW EQUATIONS
S. P. Vanka and G. K. Leaf Aug. 1983 36 p refs
(Contract W-31-109-eng-38)
(DE83-017989; ANL-83-73) Avail: NTIS HC A03/MF A01

A robust and efficient numerical scheme for the solution of the finite differenced pressure linked fluid flow equations was developed. The algorithm solves the set of nonlinear simultaneous equations by a combination of Newton's method and efficient sparse matrix techniques. In tests on typical recirculating flows the method is rapidly convergent. The method does not require any under relaxation or other convergence enhancing techniques employed in iterative schemes. It is currently described for two dimensional steady state flows but is extendible to three dimensions and mildly time varying flows. The method is robust to changes in Reynolds number, grid aspect ratio, and mesh size. The algorithm and the results of calculations performed are reported. DOE

N84-13528# California Univ., Livermore. Lawrence Livermore Lab.
THEORETICAL MODELING OF CONVERGING AND DIVERGING DETONATION WAVES IN SOLID AND GASEOUS EXPLOSIVES
Craig M. Tarver and Paul A. Urtiew 1983 32 p refs Presented at the 9th Intern. Colloq. on Dynamics of Explosions and Reactive Systems, Livermore, Calif., 4-8 Jul. 1983

(Contract W-7405-eng-48)
(DE83-017300; UCRL-88699; CONF-830704-7) Avail: NTIS HC A03/MF A01

The ignition and growth reactive flow model of shock initiation and detonation accurately calculate detonation velocity radius data on spherically diverging and converging detonation waves in the solid explosive PBX-9404. The theory of converging detonation waves is reviewed. The effects of the final reaction product state, the variability of the heat of reaction, and the equations of state are discussed for converging detonation waves in gaseous and solid explosives. It is postulated that the reaction product states follow a locus of Chapman-Jouguet (CJ) states as the detonation velocity and pressure increase. In converging gaseous detonations the heat of reaction decreases and the adiabatic exponent increases as the detonation velocity increases. In converging detonations in solid explosives equation of state uncertainties dominate the calculations, and more experimental data on overdriven detonation waves are required for improved modeling. DOE

N84-13529# Mechanical Technology, Inc., Latham, N. Y.
STIRLING-ENGINE HEAT-ACTUATED HEAT PUMP
Robert A. Ackerman, Jeffrey D. English, and Thomas M. Moynihan 1983 6 p ref Presented at the 18th Intersoc. Energy Conversion Eng. Conf., Orlando, Fla., 21-26 Aug. 1983
(Contract W-7405-eng-26)
(DE83-017137; CONF-830812-43) Avail: NTIS HC A02/MF A01

A Stirling engine driven heat actuated heat pump (HAHP) system which was developed consists of a free piston Stirling engine (FPSE) driver, a diaphragm actuated hydraulic coupling, and a Rankine cycle, resonant linear refrigerant compressor. The system and test results are described. DOE

N84-13530# Midwest Research Inst., Golden, Colo. Thermal Research Branch.
EXPERIMENTAL STUDY OF THREE-DIMENSIONAL NATURAL CONVECTION AT HIGH RAYLEIGH NUMBER
Mark S. Bohn Jun. 1983 40 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-011982; SERI/TR-252-1912) Avail: NTIS HC A03/MF A01

Natural convection heat transfer measurements and flow visualization experiments were performed in a three dimensional test cell in water. The heat transfer data were reduced to dimensionless correlations which help elucidate the mechanisms of heat transfer at high Rayleigh number in a three dimensional enclosure. Results of the flow visualization experiments further support the hypothesized heat transfer mechanisms. When the top and bottom surfaces of the enclosure are adiabatic, heat is transferred by two dimensional boundary layers which remain laminar at Rayleigh numbers as high as 7 x 10(1)0. Heating the test cell bottom produces plume like structures which transport the heat from the bottom and modify the boundary layers and, therefore, heat transfer from the vertical walls. DOE

N84-13531# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
THERMAL AND HYDRAULIC PERFORMANCE OF A SIEVE-TRAY DIRECT-CONTACT HEAT EXCHANGER
Greg L. Mines and Deborah J. Wiggins 1983 6 p refs Presented at the 18th Intersoc. Energy Conversion Eng. Conf., Orlando, Fla., 21 Aug. 1983
(Contract DE-AC07-76ID-01570)
(DE84-000663; EGG-M-00383; CONF-830812-55) Avail: NTIS HC A02/MF A01

Experiments investigating the thermal and hydraulic performance of a sieve tray direct contact heat exchanger (DCHX) were conducted using a 2750 geothermal fluid as an energy source and different hydrocarbons as working fluids. The baseline performance tests with the direct contact unit were conducted with isobutane. The thermal performance of the unit met or exceeded the design goals for individual tray thermal efficiencies and pinch points. Hydraulically the column operated near recommended design fluid veocities. Following the completion of these tests, the DCHX was operated with different mixtures of hydrocarbon working fluids. Different combinations of the isobutane/hexane family were tested followed by a series with propane/isopentane fluids. The testing conducted with the direct contact unit showed that the sieve tray column is a very efficient heat exchange device although some degradation in boiling tray efficiency and column throughput were noted when mixtures were used. DOE

N84-13532# New York Academy of Sciences, N. Y.
PROCEEDINGS OF THE 4TH INTERNATIONAL CONFERENCE ON PHYSICOCHEMICAL HYDRODYNAMICS
Robert Pfeffer, ed. 1983 548 p refs Conf. held in New York, 13 Jun. 1982 Submitted for publication
(Contract DE-FG02-82ER-12020)
(DE83-012765; DOE/ER-12010/1; CONF-8206187) Avail: NTIS HC A23/MF A01

The name Physicochemical Hydrodynamics (PCH) was given to the class of problems related to the influence of fluid flow on chemical or physical transformations and to the influence of physicochemical factors on fluid flows. The field has grown rapidly and its approach - combining the most sophisticated methods of modern theoretical and experimental physics and chemistry with the theory of fluid mechanics - has been applied to such diverse areas as mass and heat transfer in moving media, turbulence phenomena, interface mechanics, flow of non-Newtonian fluids, combustion, and flow in biological systems. The following major topics were covered: interface mechanics and multiphase systems; the theory of turbulence and its applications; transport phenomena and chemical reacting systems; the physicochemical hydrodynamics of low Reynolds number flow and the hydrodynamics of biological systems and polymers; and electrochemistry. DOE

N84-13533# Oak Ridge National Lab., Tenn. Energy Div.
PERFORMANCE TEST RESULTS OF AN ABSORPTION HEAT PUMP WHICH IS DESIGNED TO UTILIZE LOW-TEMPERATURE [600C (1400F)] INDUSTRIAL WASTE HEAT
W. R. Huntley 1983 4 p refs Presented at the 18th Intersoc. Energy Conversion Eng. Conf., Orlando, Fla., 21-26 Aug. 1983
(Contract W-7405-eng-26)
(DE83-017194; CONF-830812-47) Avail: NTIS HC A02/MF A01

A conceptual design of an absorption heat pump for upgrading industrial waste heat was developed and successfully tested. The basic lithium bromide-water closed cycle of the heat pump boosts the waste heat temperature up to process steam temperatures, thereby making it useful for industrial applications. The heat pump is designed to operate with waste heat temperatures ranging from 600C (1400F) to 900C (1940F). An innovative adiabatic absorber heat transfer concept, on which patent rights are pending, has proven effective during performance testing of the nominal 12-ton prototypical unit which is now in operation. This heat pump is a single stage machine, but multistage versions could also be built to obtain still higher temperature boosts. DOE

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N84-13534 Virginia Polytechnic Inst. and State Univ., Blacksburg.
PERTURBATION METHODS FOR SLIGHTLY DAMPED GYROSCOPIC SYSTEMS Ph.D. Thesis
Garnett Ryland 1982 141 p
Avail: Univ. Microfilms Order No. DA8313772

The perturbation theory was initially developed as an efficient

means of solving the eigenvalue problem associated with linear gyroscopic systems for which the damping and/or circulatory effects are sufficiently small that they can be regarded as perturbations. The perturbation theory is applied to an example of such a system. One interesting aspect of this example is that for one of the combinations of parameters, it exhibits both divergence and flutter instability, simultaneously. Other numerical examples are given. Dissert. Abstr.

N84-13535# National Mechanical Engineering Research Inst., Pretoria (South Africa).
INSTRUCTION MANUAL FOR THE USE OF THE CSIR TRIAXIAL ROCK STRESS MEASURING EQUIPMENT
F. A. Vreede Jun. 1982 61 p
(CSIR-ME-1763; ISBN-0-7988-1489-6; MEG/2302) Avail: NTIS HC A04/MF A01

A guide is presented for users of an instrument designed to measure the state of stress at any one point in a rock mass. The overscoring technique used to determine the absolute stress is described as well as equipment components. A computer program for processing the data is discussed and the equations on which the program is based are given. A.R.H.

N84-13536# Office of Naval Research, London (England).
THE 1982 INTERNATIONAL CONGRESS OF PHOTOGRAPHIC SCIENCE Final Report
Lawrence Slifkin (North Carolina Univ., Chapel Hill) 26 Jun. 1983 8 p Congr. held in Cambridge, England, 6-10 Sep. 1982
(AD-A132372; ONRL-C-9-83) Avail: NTIS HC A02/MF A01 CSCL 07/4

Conference papers treated topics ranging from fundamental solid state physics of the silver halides to problems in the production of photographic products. This report describes primarily contributions closer to the chemistry and physics of crystalline solids. Author (GRA)

N84-13537# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
HOLOGRAPHIC OPTICAL ELEMENTS WITH ULTRA-HIGH SPATIAL FREQUENCIES M.S. Thesis
Rolf Charles Enger 1983 131 p
(AD-A132355; AFIT/CI/NR-83-35D) Avail: NTIS HC A07/MF A01 CSCL 20/6

This dissertation describes an experimental study of optical elements with ultra-high spatial-frequency surface corrugations in both photoresist and quartz. Details of element fabrication are given and two new applications are suggested. For the photoresist gratings, angular selectivity, wavelength selectivity, and peak efficiency are investigated. The study shows that optical elements with spatial frequencies in excess of 3000 l/mm and efficiencies greater than 88% can be recorded in subwavelength thick layers of Shipley AZ-1300 series photoresist. The quartz elements are made via reactive ion etching which faithfully transfers a pattern from a photoresist mask to a fused quartz substrate. The quartz gratings have withstood laser fluxes of 4.17 GW/cm2 without sustaining damage and have efficiencies greater than 85%. Two new applications for substrates with ultra-high spatial-frequency surface corrugations are reported. Such elements at normal incidence are antireflective (AR) with broadband reflection coefficients less than 0.045%. Author (GRA)

N84-13538# California Univ., Livermore. Lawrence Livermore Lab. Applied Science Div.
AETHALOMETER: AN INSTRUMENT FOR THE REAL-TIME MEASUREMENT OF OPTICAL ABSORPTION BY AEROSOL PARTICLES
A. D. A. Hansen, H. Rosen, and T. Novakov Aug. 1983 9 p refs Presented at the 2nd Intern. Conf. on Carbonaceous Particles in the Atmosphere, Linz, Austria, 11-14 Sep. 1983
(Contract DE-AC03-76SF-00098)
(DE84-000400; LBL-16106; CONF-8309166-1) Avail: NTIS HC A02/MF A01

An instrument is described that measures the concentration of optically absorbing aerosol particles in real time. This absorption is normally due to black carbon, which is a good tracer for combustion emission. The minimum resolving times range from seconds in urban environments to minutes in remote locations. Results obtained during operation on an aircraft are presented. Due to the time resolution capability the spatial distributions of absorbing aerosol can be determined. From the Greek word for to blacken with soot, this instrument has been named the aethalometer. DOE

N84-13539# Brookhaven National Lab., Upton, N. Y.
CHANNEL ELECTRON MULTIPLIER AND OPTICALLY COUPLED AMPLIFIER USED AS AN INCIDENT-FLUX MONITOR
Graham C. Smith and Gwyn P. Williams Sep. 1983 12 p refs Presented at the 3rd Natl. Conf. on Synchrotron Radiation Instrumentation, Upton, N.Y., 12-14 Sep. 1983
(Contract DE-AC02-76CH-00016)
(DE84-001451; BNL-33703; CONF-830910-2) Avail: NTIS HC A02/MF A01

A system that performs monitoring of the incident photon flux for synchrotron radiation experiments is described. The system uses a channel electron multiplier whose output signal current, in the high voltage line, is accurately measured with an optically coupled isolation amplifier. DOE

N84-13540# California Univ., Berkeley. Lawrence Berkeley Lab.
PROCEEDINGS OF THE SEVENTH INTERNATIONAL CONFERENCE ON HIGH VOLTAGE ELECTRON MICROSCOPY
R. M. Fisher, ed., R. Gronsky, ed., and K. H. Westmacoit, ed. 1983 442 p refs Conf. held in Berkeley, Calif., 16-19 Aug. 1983
(Contract DE-AC03-76SF-00098)
(DE83-016323; LBL-16031; CONF-830819) Avail: NTIS HC A19/MF A01

Advances in high voltage electron microscopy were examined. Topics include resolution, techniques and instrumentation, radiation effects, in-situ and phase transformations, minerals and ceramics, and semiconductors and thin films. Twenty three papers were abstracted separately for the data base. DOE

N84-13541# New Mexico State Univ., Las Cruces.
THE TRANSIENT RESPONSE OF CIRCULAR FOIL HEAT-FLUX GAGES
Michael A. Grothus, George P. Mulholland, Richard G. Hills, and Billy W. Marshall Jul. 1983 188 p refs
(Contract DE-AC04-76DP-00789)
(DE83-017785; SAND-83-0263) Avail: NTIS HC A09/MF A01

Relationships that describe the transient response of circular foil heat flux gages are described. Prediction of the gage surface flux for nonsteady state conditions based on the measured temperature response of the gage is achieved through application of a numerical deconvolution method. Sensitivity and uncertainty analyses were conducted to examine which gage parameters have the greatest effect on the determination of heat flux; these include the foil thermophysical properties, thickness, and maximum radius. DOE

N84-13542# Pacific Northwest Lab., Richland, Wash.
A GUIDE FOR EFFLUENT RADIOLOGICAL MEASUREMENTS AT DOE INSTALLATIONS
J. P. Corley and C. D. Corbit Washington, D.C. DOE Jul. 1983 133 p refs
(Contract DE-AC06-76RL-01830)
(DE83-016639; DOE/EP-0096) Avail: NTIS HC A07/MF A01

Effluent monitoring and reporting programs are maintained at all US Department of Energy (DOE) facilities that may: (1) discharge significant concentrations of radioactivity in relation to applicable standards, or (2) discharge quantities of radioactivity that have potential health and safety or other environmental significance. This Guide is intended to provide supplemental guidance to DOE Orders on methods, procedures, and performance criteria to bring more comparable rationale to DOE facility effluent measurement programs and promote compliance with applicable standards and provide the DOE Office of Operational Safety (OOS) and Operations

Offices with an additional tool for evaluating effluent measurement programs at DOE facilities. DOE

N84-13543# California Univ., Livermore. Lawrence Livermore Lab.
MEASURING THE NEUTRON ENERGY SPECTRUM OF LASER-FUSION TARGETS WITH CR-39
S. M. Lane 1 Sep. 1983 12 p refs Presented at the 12th Intern. Conf. on Solid State Nucl. Track Detectors, Acapulco, Mexico, 4-10 Sep. 1983
(Contract W-7405-eng-48)
(DE84-001422; UCRL-88970; CONF-830969-2) Avail: NTIS HC A02/MF A01

A detector capable of measuring the neutron energy spectrum from a laser fusion target containing DT fuel was developed. The compressed areal density of the DT inferred by observing the fraction of 14.1 MeV neutrons downshifted in energy by elastic scattering. The proton sensitivity and sample readability of 5 types of CR-39 in the energy range 3 to 11 MeV was analyzed. It is found that a type fabricated from a monomer Allymer, most acceptable. Calibration curves are obtained for this plastic at energies of 3 to 15 MeV and dip angles ranging from 75 to 900. These curves used to unfold a 14.7 MeV spectrum generated at the rotating target neutron source. DOE

N84-13544# Bendix Corp., Kansas City, Mo.
COORDINATE-MEASURING MACHINE CAPABILITY
R. J. Russell Nov. 1983 45 p refs
(Contract DE-AC04-76DP-00613)
(DE84-002014; BDX-613-2962) Avail: NTIS HC A03/MF A01

Three-axis measuring machines have complex geometric and displacement errors. Many machine users are unaware of these systematic errors and think only in terms of the three-scale or displacement errors which may be significantly smaller in magnitude than the geometric errors. A method of estimating the columetric uncertainty of five coordinate measuring machines (CMMs) was established and the measurement uncertainty is reported for a 20 by 18 by 12 in. work zone. The Latin Square Three Dimensional Ball Plate (LS3DBP) and the Space Master Ball Plate (SMBP) were the volumetric standards selected for the evaluation. Data from each ball plate were transformed into new coordinates and compared to previous calibration or reference data. The deviation between measured and referenced values was recorded. These data were used to determine a quantitative estimate of the CMMs measurement capability in X, Y, and Z space by using the Analysis of Variance Technique (AOV). DOE

N84-13545# Bendix Corp., Kansas City, Mo.
DESCRIPTION OF A METHOD AND ARTIFACT FOR ESTIMATING VOLUMETRIC UNCERTAINTY OF COORDINATE MEASURING MACHINES Final Report
L. L. Jones and J. V. Grice Nov. 1983 104 p refs
(Contract DE-AC04-76DP-00613)
(DE84-002017; BDX-613-2961) Avail: NTIS HC A06/MF a01

Methodology that expresses the volumetric uncertainty of coordinate measuring machines (CMMs) in a single index is developed. A Latin Square Three Dimensional Ball Plate (LS3DBP) is the artifact used to obtain statistically balanced data that are analyzed using Latin square analysis of variance (AOV) to provide quantitative estimates of systematic and random error in the CMM measurement system. Estimates of systematic and random error for the nominal values assigned to the LS3DBP are obtained from analysis of calibration data using one way AOV. A single index, expressed in radial distance, is obtained by combining the systematic and random errors of the artifact and CMM measurement system with the fixed error assigned to the primary measurement system. The Latin square analysis is also used to identify 15 single sources of error in machine geometry by interpretation of the form of axis effects and by using one and two dimensional plots. The notation and methodology developed can be extended to measurement systems other than CMMs. It is currently being used to evaluate robotics machines and numerical control milling machines. The use of the LS3DBP requires 70 percent less time than some conventional techniques to estimate CMM uncertainty in volumetric spaces. DOE

N84-13546# Environmental Protection Agency, Ann Arbor, Mich. Engineering Operations Div.
HUMIDITY MEASUREMENT COMPARISON TESTS: DEW POINT HYGROMETER VERSUS WET BULB PSYCHROMETER
Sherman D. Funk Jan. 1983 15 p refs
(PB83-237487; EPA-AA-EOD-ES-83/1) Avail: NTIS HC A02/MF A01 CSCL 14B

This report examines the various tests made to characterize and quantify causes of differences in results between the dew point hygrometer and the wet bulb psychrometer methods of measuring humidity. The Environmental Protection Agency Motor Vehicle Emissions Laboratory in Ann Arbor, Michigan is implementing the dew point hygrometer method in the Light Duty test cells. Tests were necessary in order to identify any potential impact on motor vehicle exhaust emissions and fuel economy test results. GRA

N84-13547# Bureau of Mines, Rolla, Mo.
DIGITAL INSTRUMENTATION PACKAGE OR AN IMPROVED TORSION PENDULUM
R. W. Nash and A. E. Schwaneke Jun. 1983 15 p refs
(PB83-240424; BM-RI-8774; LC-83-60004-1) Avail: NTIS HC A02/MF A01 CSCL 14B

This report describes the design and operation of a digital instrumentation package for the Bureau of Mines improved torsion pendulum, a scientific instrument that measures the vibration damping of metallic materials. The new design eliminates manual analog-to-digital conversion, reduces the data acquisition time, and increases the precision of the measurements. The digital output can be coupled directly to a micro-processor or computer to produce the final data in real time. Author (GRA)

N84-13411*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
INTERCONTINENTAL TIME AND FREQUENCY TRANSFER USING A GLOBAL POSITIONING SYSTEM TIMING RECEIVER
P. A. Clements *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 98-104 ref (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 14B

36 LASERS AND MASERS

Includes parametric amplifiers.

N84-13548*# Stanford Univ., Calif. Dept. of Applied Physics.
HIGH ENERGY EFFICIENT SOLID STATE LASER SOURCES Annual Technical Report, 1 Jun. - 31 May 1983
Robert L. Byer Oct. 1983 45 p refs
(Contract NAG1-182)
(NASA-CR-174606; NAS 1.26:174606; GL-3634) Avail: NTIS HC A03/MF A01 CSCL 20E

Slab glass performance studies demonstate 18 J of output at 2 Hz with 2.3% wall plug efficiency. The goal is to achieve 10 J per pulse at 10 Hz and 3% wall plug efficiency during the next annual period. The slab concept was extended to Nd:YAG and to Nd:GGG. To date over 80 W of CW output power at 2% efficiency was generated in slab Nd:YAG. A multiplexed slab Nd:YAG pre-amplifier was invented and a Nd:YAG oscillator was demonstrated with 100kHz linewidth for eventual use in wind velocity measurements. Author

N84-13549# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
NdP5O14 CRYSTAL USED FOR MINIATURE RANGEFINDER
19 Aug. 1983 6 p Transl. into ENGLISH from Jiguang (China), v. 9, no. 10, 1982 p 684
(AD-A132541; FTD-ID(RS)T-0348-83) Avail: NTIS HC A02/MF A01 CSCL 20/5

A 70 mm long NdP5O14 crystal weighing 60 lbs and with good optical properties was grown and used with a miniature xenon lamp pumped, Q-tunable dye laser weighing 23 grams to determine its rangefinding capability. Results show the measurement range is 60 to approximately 300 m, with an accuracy of 2.5m and a ranging probability of 96%. Papers presented at a color center laser symposium are summarized. Topics covered include color center physics, and development trends into research with color center applications in chemistry, optical frequency measurement, and laser frequency measurement. A.R.H.

N84-13550# New Mexico Univ., Albuquerque.
THEORETICAL STUDIES OF OXYGEN-IODINE LASER MECHANISMS AND NEW LASER CONCEPTS Final Report
J. C. Bellum Kirtland AFB, N. Mex. AFWL Aug. 1983 20 p
(Contract F29601-82-K-0017; AF Proj. 3326)
(AD-A132374; AFWL-TR-83-19) Avail: NTIS HC A02/MF A01 CSCL 20/5

This report summarizes theoretical studies of molecular dynamics, of spin-forbidden molecular transitions, of gain-dependent dispersions in excimer lasers, and of path-integral approaches applied to descriptions of quantum optical phenomena. It also summarizes two other studies, one of injection locking of arrays of lasers and another of detuning effects in laser instabilities. Author (GRA)

N84-13551# Lockheed Missiles and Space Co., Huntsville, Ala. Huntsville Research and Engineering Center.
A SURVEY OF ELECTRIC LASER CODES
Francis C. Wang Redstone Arsenal, Ala. Army Missile Command Jun. 1983 120 p
(Contract DAAH01-80-C-1289)
(AD-A132352; AD-E950428; LMSC-HREC-TR-D784124; DRSMI/RH-CR-83-6) Avail: NTIS HC A06/MF A01 CSCL 20/5

This report summarizes information gathered on a survey of available computer codes which can be used to analyze electric laser devices. The laser systems include carbon monoxide, carbon dioxide and excimers operating in either the CW or pulsed modes. Technical areas surveyed include kinetics, optics, and gas dynamics. Author (GRA)

N84-13552# Defence Research Establishment Valcartier (Quebec).
A FREQUENCY STABILIZATION AND TRIGGER CONTROL UNIT FOR HYBRID TEA-CO2 LASERS
J. M. Cruickshank, V. Larochelle, and P. Pace Jun. 1983 30 p
(AD-A132247; DREV-4301/83) Avail: NTIS HC A03/MF A01 CSCL 20/5

A simple, reliable technique is described for frequency stabilizing a CW-TEA hybrid laser for use as a transmitter in a laser radar system with heterodyne detection. In this technique, modulation is applied to the laser cavity, the output frequency of the laser is monitored when operating in the CW mode, and the TEA laser discharge is triggered when the desired output laser frequency is detected. Details are given of the electronics used to implement the technique, as well as those for controlling the pulse repetition rate and protecting the laser itself if arcs are generated in laser discharge. Author (GRA)

N84-13553# California Univ., Livermore. Lawrence Livermore Lab.
LARGE LASER SYSTEM FACILITY DESIGN
Thomas J. Gilmartin 9 Aug. 1983 40 p Presented at the Intern. Conf. on Lasers, Guangzhou, China, 6-9 Sep. 1983 Submitted for publication
(Contract W-7405-eng-48)
(DE84-000159; UCRL-88814; CONF-8309155-1) Avail: NTIS HC A03/MF A01

Optical stability of foundations and support structures, environmental control, close-in subsystem integration, spatial organization, materiel flow and access to remote subsystems is discussed and compared for four laser facilities: The Special Isotope Separation Laboratory, Argus, Shiva/Nova, and Firepond. DOE

N84-13554# Iowa State Univ. of Science and Technology, Ames. Dept. of Physics.
HIGH-SENSITIVITY LASER SPECTROSCOPY WITH ATOMS FROM A COOLED HELIUM JET
D. A. Lewis, R. M. Evans, C. N. Davids (ANL), M. A. Finn (Minnesota Univ., Minneapolis), S. L. Kaufman (Minnesota Univ., Minneapolis), and G. W. Greenlees (Minnesota Univ., Minneapolis) 1983 8 p refs Presented at the 27th Ann. Intern. Tech. Symp. on High Speed Photography, Videography and Photonics, San Diego, Calif., 21 Aug. 1983
(Contracts DE-AC02-79ER-10496; W-31-109-eng-38; DE-AC02-83ER-40098; Grant NSF PHY-79-21336)
(DE84-000614; CONF-830874-28) Avail: NTIS HC A02/MF A01

A cryogenic He-jet system which efficiently transports radioactive atoms produced on line, at the tandem linac accelerator away from the production region and forms them into a cool atomic beam was developed. This atomic beam is probed with high sensitivity laser spectroscopy using the photon burst method. The sizes, shapes, and magnetic moments of short lived nuclei through their atomic hyperfine structure are determined. Preliminary measurements with the He-jet system and the adaption of the photon burst method to this new geometry are described. DOE

N84-13555# Los Alamos Scientific Lab., N. Mex. Applied Theoretical Physics Div.
EVIDENCE FOR A HOT ELECTRON FLUX LIMIT IN LASER-PRODUCED PLASMA EXPERIMENTS
Gene H. McCall 1983 11 p refs Presented at the Intern. Conf. on Lasers, Guangzhou, China, 6 Sep. 1983
(Contract W-7405-eng-36)
(DE84-001365; LA-UR-83-2568; CONF-8309155-2) Avail: NTIS HC A02/MF A01

The necessity to impose a flux limit on the thermal electron transport in diffusion calculations of laser produced plasmas to explain the observed partition of energy into fast and slow ions and X-rays is outlined. The effect of such a limit is to retain the deposited energy in the corona of the target. The containment increases the energy loss to fast ions, reduces the X-ray emission, and reduces the hydrodynamic efficiency. Although calculations for plasmas produced by lasers having wavelengths of 1 (SIGMA)m or shorter agree with experiment when a flux limit which is 1/30 times the classical flux limit is applied to the electron thermal flux. It is shown that such a flux limit cannot explain the results obtained for 10 (SIGMA)m lasers. It is shown that it is necessary to invoke a flux limit on the hot or suprathermal electrons. DOE

N84-13556# Naval Research Lab., Washington, D. C. Plasma Physics Div.
ANALYSIS OF STABILITY AND SYMMETRY IMPLICATIONS FOR ICF Interim Report
J. H. Gardner, S. E. Bodner, J. P. Boris, M. H. Emery, M. J. Fritts, and M. J. Herbst 12 Oct. 1983 23 p refs Presented at the 6th Intern. Workshop on Laser Interaction and Related Plasma Phenomena, Monterey, Calif., 25-29 Oct. 1982
(Contract DE-AI01-77DP-40042)
(DE84-000640; NRL-MR-5170; CONF-821089-14) Avail: NTIS HC A02/MF A01

The theoretical and computational work to evaluate the design contraints that are imposed primarily by the symmetry and stability requirements on directly driven laser fusion targets are reported. Pellet gains in excess of 100 are necessary for most applications of inertial fusion. To achieve these high gains a number of critical physics elements must be controlled. These include: (1) high coupling efficiency; (2) low fuel preheat; (3) implosion symmetry; (4) implosion stability; and (5) an ignition scheme. These factors interact with each other providing conflicting requirements. DOE

N84-13557# California Univ., Livermore. Lawrence Livermore Lab.
SIMULATION OF A HIGH-GAIN TAPERED-WIGGLER FREE-ELECTRON LASER
W. M. Fawley, E. T. Scharlemann, and D. Prosnitz 27 Sep. 1983 6 p refs Presented at the 5th Intern. Conf. on High-Power Particle

Beams, San Francisco, 12-14 Sep. 1983
(Contract W-7405-eng-48)
(DE84-001237; UCRL-89867; CONF-830911-25) Avail: NTIS HC A02/MF A01

Results from a numerical model of a high gain (electron-beam power > input laser beam power) FEL amplifier are presented. A number of two dimensional effects must be considered in an FEL amplifier design. In many tapered wiggler designs, the wiggler length may be a half dozen or more Rayleigh lengths Z sub R and thus diffraction losses will play an important role. As the laser beam propagates in the longitudinal direction Z, the beam spreads out radially, thus lessening the depth of the pondermotive well (or 'buckets') in which trapped electrons execute their synchroton motion. DOE

N84-13558# Texas A&M Univ., College Station. Dept. of Physics.
LASER-INDUCED FLUORESCENCE LINE NARROWING IN ATOMIC VAPORS
T. Meier and H. A. Schuessler 1983 12 p
(Contract DE-AS05-80ER-10578)
(DE83-018216; DOE/ER-10578/T3) Avail: NTIS HC A02/MF A01

The use of highly monochromatic light which allows the selective excitation of atoms in vapors if excitation and detection of the fluorescence is carried out collinearly was discussed. The atoms capable of absorbing light form an atomic beam of well defined velocity along the direction of the laser beam, but no velocity selection occurs perpendicular to it. The potential of the technique for Doppler free atomic spectroscopy and for the study of excited atom collisions is demonstrated using the NA D1 line. DOE

N84-13559# Monsanto Research Corp., Miamisburg, Ohio.
COMPONENT TEMPERATURE VERSUS LASER-WELDING PARAMETERS
William H. Jones 1983 6 p Presented at the 3d Intern. Colloq. on Welding and Melting by Electrons and Laser Beams, Lyon, 5-9 Sep. 1983
(Contract DE-AC04-76DP-00053)
(DE84-000362; MLM-3105(OP); CONF-8309158-1) Avail: NTIS HC A02/MF A01

The component temperature near a laser weld which is critical because of possible damage to the explosive powder adjacent to the member being welded was examined. The thermal excursion experienced at the powder cavity wall was evaluated. The affect of changes in the laser welding parameters on the powder cavity wall temperature was determined. The objective lens to work distance, pulse rate, and beam power parameters were varied and the peak temperature varied from 1170C to 3110C in response to welding parameter changes. It is concluded that by utilizing a selected set of welding parameters, the design requirement of a 1600C maximum powder cavity wall temperature can easily be satisfied. DOE

N84-13560# Los Alamos Scientific Lab., N. Mex.
LASER-PLASMA INTERACTION AT 10.6 MICRONS
Roger D. Jones and Joseph M. Kindel 1983 36 p refs Presented at the Spring Coll. on Radiation in Plasmas, Trieste, Italy, 24 May 1983
(Contract W-7405-eng-36)
(DE84-001038; LA-UR-83-2840; CONF-8305127-2) Avail: NTIS HC A03/MF A01

The absorption mechanisms at 10.6(SIGMA)m are considered. At high intensity CO2 absorption is a combination of resonant absorption, critical surface decay processes (rippling), and forward and backward Raman scattering. It is believed that at low intensities in short pulse CO2 experiments, resonant absorption dominates. The properties of the self generated magnetic fields are considered and these fields along the surface of the target, and the enhanced plasma blowoff. The properties of the enhanced plasma blowoff are discussed. In directly driven targets, this blowoff represents an energy loss. It is suggested that the blowoff itself can be used to drive targets. DOE

N84-13561# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.
ELECTRON-CYCLOTRON MASER AND WHISTLER INSTABILITIES IN A RELATIVISTIC ELECTRON PLASMA WITH LOSS-CONE DISTRIBUTION
K. T. Tsang Sep. 1983 28 p refs
(Contract DE-AC03-76ET-53057)
(DE84-001607; SAI-82-1014/PRI-83) Avail: NTIS HC A03/MF A01

The electron-cyclotron maser and whistler instabilities were investigated. The dispersion on relation is solved numerically and extensive parametric studies are performed. It is found that growth rates for both instabilities increase with perpendicular hot electron temperature and the size of the loss cone. DOE

N84-13562# Pennsylvania State Univ., University Park.
STUDIES OF IONS IN A DRIFT FIELD: LASER DIAGNOSTICS OF EXCITED STATES AND MEASUREMENTS OF THERMOCHEMICAL PROPERTIES AT EQUILIBRIUM
A. W. Castleman, Jr. and R. G. Keesee 1983 9 p refs Presented at 3 Intern. Swarm Seminar, Innsbruck, 3 Aug. 1983
(Contract DE-AC02-82ER-60055)
(DE84-000363; CONF-8308112-3) Avail: NTIS HC A02/MF A01

The high pressure drift/mass spectrometer detection technique which is used to investigate the thermochemical properties of ions and their related cluster is discussed. The extent to which ions drifting in an electric field are thermalized is analyzed. Some laser techniques which are enabling an investigation of the possible presence of excited ions in a drift field are described. Some recent findings and trends in the stability of ion clusters of single and mixed constituents are reported. DOE

N84-13563# Sandia Labs., Albuquerque, N. Mex.
PARTICLE VELOCITY MEASUREMENTS IN LASER IRRADIATED FOILS USING ORVIS
S. A. Sheffield and G. A. Fisk 1983 5 p refs Presented at the Am. Phys. Soc. Meeting on Shock Waves in Condensed Media, Santa Fe, N. Mex., 18 Jul. 1983
(Contract DE-AC04-76DP-00789)
(DE83-016829; SAND-83-1334C; CONF-830719-43) Avail: NTIS HC A02/MF A01

Aluminum foils from 2 to 200-(SIGMA)m thick were subjected to a Nd:YAG laser pulse of low irradiance to produce laser driven shocks in the foils. The particle velocity history of the foil side opposite the laser deposition was monitored with nanosecond resolution by a velocity interferometer system called ORVIS. It is indicated that a shock reverberation process accelerates the foil. Peak foil velocities can be adequately calculated using a ricket propulsion model developed from experiments at much higher irradiances. A velocity of 1 km/s was developed in a 2-(SIGMA)m-thick free oil in a time of 50 ns. Water confined foils attained peak particle velocities about three times higher than those of free foils. DOE

N84-13564# Los Alamos Scientific Lab., N. Mex.
DESIGN OF A HIGH-BRIGHTNESS, LOW-JITTER, SHORT-PULSE LASER FOR PLASMA DIAGNOSTICS
P. Lacovara Aug. 1983 11 p refs
(Contract W-7405-eng-36)
(DE84-000129; LA-9830-MS) Avail: NTIS HC A02/MF A01

The High Density Z-Pinch machine produces a small high density plasma, on a time scale of 10 to 100 ns. This plasma is analyzed by the Moire-Schlieren diagnostic technique using a fast pulse nitrogen laser. A high-brightness, low jitter, low divergence laser system designed for this purpose using an oscillator amplifier configuration is described. DOE

N84-13565# Naval Research Lab., Washington, D. C.
VORTEX SHEDDING AND LASER ABLATION Interim Report
M. H. Emery, J. H. Gardner, J. P. Boris, and A. L. Cooper 22 Sep.

1983 14 p refs
(Contract DE-AI01-77DP-40042)
(DE84-000301; AD-A133467; NRL-MR-5089) Avail: NTIS HC A02/MF A01

The vortex dynamics of laser ablatively accelerated targets were examined. The inhibited linear Rayleigh-Taylor growth rates, the role of the Kelvin-Helmholtz roll-up was discussed. The short wavelength cutoff, and theoretically reproduced dynamically stabilized growth rates and prediction of magnetic field structures throughout the overdense region which lead to a physically motivated model of thermal flux inhibition are outlined. DOE

N84-13566# California Univ., Livermore. Lawrence Livermore Lab.
INERTIAL EFFECTS IN LASER-DRIVE ABLATION
Robert J. Harrach, Abraham Szoeke, and W. Michael Howard 15 Jul. 1983 7 p refs Presented at the Am. Phys. Soc. 1983 Topical Conf. on Shock Waves in Condensed Matter, Santa Fe, N. Mex., 18-21 Jul. 1983
(Contract W-7405-eng-48)
(DE84-000071; UCRL-88652; CONF-830719-44) Avail: NTIS HC A02/MF A01

The gas dynamic partial differential equations (PDE's) which govern the motion of an ablatively accelerated target (rocket) contain an inertial force term that arises from acceleration of the reference frame in which the PDE's are written are described. The effect and its magnitude and parametric dependences are estimated by approximate analytical formulas inferred from computer hydrocode calculations. It is found that often this inertial term is negligible but for problems in the areas of laser fusion and laser equation of state studies. It is found that it can substantially reduce the attainable hydrodynamic efficiency of acceleration and implosion. DOE

N84-13567# Argonne National Lab., Ill. Materials Science and Technology Div.
NARROW-BAND, NEAR-UV, HIGH-REPETITION-RATE LASER-INDUCED FLUORESCENCE SYSTEM FOR USE AS AN EDGE DIAGNOSTIC IN FUSION MACHINE
C. E. Young, D. M. Gruen, M. J. Pellin, and W. F. Calaway 1983 12 p refs Presented at the 9th Intern. Vacuum Congr. and 5th Intern. Conf. on Solid Surfaces, Madrid, 26 Sep. - 1 Oct. 1983
(Contract W-31-109-eng-38)
(DE84-000586; CONF-8309103-9) Avail: NTIS HC A02/MF A01

A laser system for impurity diagnostics in the edge region of fusion devices is described. A single mode CW dye laser with scan capability of 30 GHz in 100 msec is amplified by 3 fast flow dye cells, pumped by a high repetition rate excimer laser. Average power during the 8 ns pulses of about 0.8 MW for amplified narrowband output at 604 nm, and 80 kW after frequency doubling in KD*P was achieved, with spectral bandwidth in the tenths of GHz regime. The usefulness of such high resolution is demonstrated by a model calculation for Fe velocity spectra involving the presence of thermal and sputtered flux, and spatial averaging. Laboratory velocity spectra are presented for Fe atoms, sputtered in the a(5) D4 ground state. DOE

N84-13568# California Univ., Livermore. Lawrence Livermore Lab.
THE NOVA LASER ASSURANCE-MANAGEMENT SYSTEM
Allen J. Levy 18 Jul. 1983 23 p refs Presented at the 10th Ann. Energy Div. Conf. Am. Soc. for Quality Control, San Diego, Calif., 18-21 Sep. 1983
(Contract W-7405-eng-48)
(DE83-018188; UCRL-89328; CONF-8309145-1) Avail: NTIS HC A02/MF A01

The Nova assurance management system which was developed by using the quality assurance (QA) approach first implemented in early 1978 is described. The LLNL QA program is described as an introduction to the Nova assurance management system. The Nova system is described pictorially through the Nova configuration, subsystems and major components, interjecting the QA techniques which are being pragmatically used to assure the successful completion of the project. DOE

N84-13569# California Univ., Livermore. Lawrence Livermore Lab.
A PROGRAMMABLE CONTROLLER WITH OVERCURRENT LATCH FOR CONSTANT PRIMARY PEAK CURRENT IN CAPACITOR-CHARGING FET SWITCHER FOR NOVA
A. M. Mihalka 1983 4 p ref Presented at the 4th IEEE Intern. Pulsed Power Conf., Albuquerque, N. Mex., 6-8 Jun. 1983
(Contract W-7405-eng-48)
(DE83-018184; UCRL-88670; CONF-830621-42) Avail: NTIS HC A02/MF A01

The flashlamps supply for the 10 mm laser amplifiers must be repeatable. Therefore, a constant current, linearly charging power supply was designed. Since it is a capacitor, the load varies throughout the charge cycle. At first the load is great, and di/dt of load current is at a maximum. As the capacitor charges the initial conditions for each cycle change, the power supply in effect sees a smaller capacitance, and di/dt decreases. A way of gradually increasing the on-time of the current pulses so that the transistors in the power pridge are turned off when they reach their maximum peak current is needed. The normal current sense response of the control chip is not fast enough to be useful for the present application. The deadtime, or the time that all the bridge transistors are turned off, is fixed so that as the pulse width varies so does the period. The end result is a constant peak current, switching power supply with frequency varying from 50 khz to 20 hz. An overcurrent latch protects the transistors from bridge or transformer faults. DOE

N84-13570# KMS Fusion, Inc., Ann Arbor, Mich.
SIMULATIONS AND THEORETICAL IMPLICATIONS OF KMS TRANSPORT EXPERIMENTS FOR 1.05 MICRON AND 0.53 MICRON LASER RADIATION
Walter Fechner 1983 20 p Presented at the 16th ECLIM, London, 25-29 Sep. 1983
(Contract DE-AC08-82DP-40152)
(DE84-000824; DOE/DP-40152-T3) Avail: NTIS HC A02/MF A01

Transport physics associated with laser/fusion target reactions is discussed. Specifically, theoretical modelling of transport inhibition, analysis of thermal and suprathermal transport results, and evidence for suprathermal transport inhibition in experimentation are addressed. M.G.

N84-13571# Pacific Northwest Lab., Richland, Wash.
ATOMIC-BEAM DENSITY DETERMINATION FROM LASER-INDUCED FLUORESCENCE INTERVAL DISTRIBUTIONS
Ray A. Warner, Bruce A. Bushaw, and James H. Kaye Sep. 1983 6 p refs Presented at the Laser-based Ultrasensitive Spectroscopy and Detection Conf., San Diego, Calif., 23 Aug. 1983
(Contract DE-AC06-76RL-01830)
(DE84-000677; PNL-SA-11189; CONF-8308114-2) Avail: NTIS HC A02/MF A01

A resonance fluorescence method is demonstrated whereby the density of an atomic beam can be determined reliably. This determination is based on the distribution of time intervals detected photons, and is made without independent knowledge of excitation cross sections, laser beam intensity, or photon counting efficiency. DOE

N84-13572# Los Alamos Scientific Lab., N. Mex.
APPROACH TO SINGLE-MOLECULE DETECTION BY LASER-INDUCED FLUORESCENCE
Norman J. Dovichi (Wyoming Univ., Laramie), John C. Martin, James H. Jett, Mitchell Trkula, and Richard A. Keller Aug. 1983 4 p refs Presented at the 27th Ann. Intern. Tech. Symp. on High Speed Photography, Videography and Photonics, San Diego, Calif., 21 Aug. 1983
(Contract W-7405-eng-36)
(DE84-001338; LA-UR-83-2665; CONF-830874-29) Avail: NTIS

HC A02/MF A01

A sheath flow curvette was evaluated in laser-induced fluorescence determination of aqueous rhodamine 6G. A detection limit of 18 attograms was obtained within a one second signal integration time. The concentration detection limit was 8.9 x 10 to 14th power mole per liter. An average of one half rhodamine 6G molecule was present within the 11 pL excitation volume. However, during the signal integration time a total of 22,000 analyte molecules passed through the excitation in a 0.42 microliter volume. DOE

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N84-13573 Oklahoma State Univ., Stillwater.
SURFACE CONTACT WEAR AND ABRASIVE WEAR IN LUBRICATED SLIDING MECHANISMS Ph.D. Thesis
Richi Inoue 1982 221 p
Avail: Univ. Microfilms Order No. DA8315701

Surface contact wear and abrasive wear occurring on lubricated sliding surfaces are studied. The theoretical considerations included not only the development of wear models but also the consideration of effects of the sliding surface materials, the surface geometries, the fluid lubricity, and the sliding condition on wear generation based on the theoretical models. The experimental considerations included the development of the methodology necessary to verify the developed theoretical wear models. Experimental tests were conducted with the use of appropriate test facilities. Under boundary lubrication conditions where the sliding surfaces contact each other, a fluid with better lubricity corresponds to less surface contact wear. The friction of the lubricated surfaces significantly changes due to material hardness under static conditions. The effect of material hardness on adhesion is insignificant at a high sliding velocity. Dissert. Abstr.

N84-13574 Purdue Univ., Lafayette, Ind.
A ROTARY VANE OPEN REVERSED BRAYTON CYCLE AIR CONDITIONING AND REFRIGERATION SYSTEM Ph.D. Thesis
Thomas Claude Edwards 1970 285 p
Avail: Univ. Microfilms Order No. DA8318488

Results of an analytical and experimental investigation of the feasibility of using a combination compressor-expander-circulator rotary vane device in the open reversed Brayton cycle for the purpose of producing a simple and economic system of air conditioning and refrigeration of low to moderate capacity are reported. The prototype system tested is designed specifically to be competitive with conventional automotive air conditioning systems. A mathematical model of each component was developed, taking into consideration a variety of real effects. This mathematical model was used to study performance and operating charactistics of the system as functions of physical and environmental variables. The prototype design was based on results of these studies. The computer model predicted that a cooling capacity of 5000 BTU per hour with an operating coefficient of performance of 1.0 could be obtained in a compressor unit of 120 cubic inches, total internal displacements, operating at 2000 revolutions minute. Laboratory tests demonstrate that the prototype system performed much as expected and the accuracy of the mathematical model is generally verified. Dissert. Abstr.

N84-13575# British Library Lending Div., Boston Spa (England).
METHODS OF OPTIMIZING PARAMETERS OF MECHANISMS PERFORMING REPEATED BRIEF OPERATIONS
V. F. Egorov 25 Oct. 1983 6 p refs Transl. into ENGLISH from Izv. (USSR) p 136-138
(BLL-M-35352) Avail: British Library Lending Div., Boston Spa, Engl.

An investigation was made of the functional interrelation of the main parameters of mechanisms that work with many repetitions of tasks of brief duration. A method was developed for the combined selection of parameters from the requirement of minimal working time of the mechanisms. The proposed method is sufficiently simple and can be implemented with a computer. It can be used, for example, to choose the right electric motor specification for mechanisms of this type. S.C.L.

N84-13576*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRESSURE SYSTEM RECERTIFICATION AT NASA-LANGLEY RESEARCH CENTER
C. Michael Hudson and James W. Ramsey, Jr. Dec. 1983 16 p refs
(NASA-TM-85733; NAS 1.15:85733) Avail: NTIS HC A02/MF A01 CSCL 14B

Langley Research Center pressure systems are being recertified to ensure safe operation of these systems. The procedures for recertifying these pressure systems are reviewed. Generally, the analysis and inspection requirements outlined in the appropriate national consensus codes are followed. In some instances where the requirements of these codes are not met. The systems are analyzed further, repaired, modified and/or testad to demonstrate their structural integrity. S.C.L.

N84-13577*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MEASUREMENT OF ROLLING FRICTION BY A DAMPED OSCILLATOR
Moshe Dayan and Donald H. Buckley Dec. 1983 8 p refs
(NASA-TP-2257; E-1583; NAS 1.60:2257) Avail: NTIS HC A02/MF A01 CSCL 20K

An experimental method for measuring rolling friction is proposed. The method is mechanically simple. It is based on an oscillator in a uniform magnetic field and does not involve any mechanical forces except for the measured friction. The measured pickup voltage is Fourier analyzed and yields the friction spectral response. The proposed experiment is not tailored for a particular case. Instead, various modes of operation, suitable to different experimental conditions, are discussed. Author

N84-13578# Aeronautical Research Labs., Melbourne (Australia).
IMPROVING THE FATIGUE PERFORMANCE OF THICK ALUMINUM ALLOY BOLTED JOINTS BY HOLE COLD-EXPANSION AND THE USE OF INTERFERENCE-FIT STEEL BUSHES
J. Y. Mann, G. W. Revill, and W. F. Lupson Apr. 1983 69 p refs
(ARL-STRUC-Note-486; AR-002-948) Avail: NTIS HC A04/MF A01

Fatigue tests under a flight by flight loading sequence were carried out on small bolted joint specimens of 23 mm thickness representing part of the spar rear flange/skin attachment in Mirage III aircraft. It is shown that by cold expanding the bolt holes take standard oversize bolts, or by installing inference-fit bushes, the fatigue life can be more than doubled compared with the use of standard close fit bolts in reamed holes. No significant differences were found between the fatigue lives of specimens embodying low-alloy steel or stainless steel bushes. It is suggested that when small sized residual fatigue cracks are present, hole cold expansion may be a suitable process for extending the fatigue life. E.A.K.

N84-13579# National Research Inst. for Oceanology, Stellenbosch (South Africa). Coastal Engineering and Hydraulics Div.
INVESTIGATION OF THE GENERATION OF REGULAR WAVES BY A SLIDING VALVE PNEUMATIC WAVE GENERATOR
J. W. Kluger Apr. 1982 47 p ref
(CSIF-RR-553; ISBN-0-7988-2210-4) Avail: NTIS HC A03/MF A01

The factors which influence the performance of the sliding valve type wave generator were analyzed and then modifications were suggested to improve the quality of the generation of regular waves in the laboratory. The tests done to date on a pneumatic wave generator in which a sliding valve, instead of a disc valve, was used to control the suction in the wave-generating compartments are summarized. S.L.

N84-13580# Cincinnati Univ., Ohio. Dept. of Mechanical and Industrial Engineering.
MODELLING OF SUBMERGED CABLE DYNAMICS
James W. Kamman and Ronald L. Huston 1 Jul. 1983 35 p
(Contract N00014-76-C-0139)
(AD-A132495; UC-MIE-070183-16-ONR) Avail: NTIS HC A03/MF A01 CSCL 13/10

Results from a series of simulated submerged cable maneuvers are presented. The simulations are obtained using a three-dimensional, finite-segment model of the cable. The model, called UCIN-CABLE, consists of a series of pin connected rigid rods. Fluid drag, inertia, and buoyancy forces are included. Two types of simulation are presented: buoy release and anchor drop. The results compare favorably with experimental data and with data obtained from finite-element modelling. Author (GRA)

N84-13581# Avco Lycoming Div., Stratford, Conn.
DEVELOPMENT OF RECUPERATOR MANUFACTURING TECHNIQUES, PHASE 2 Final Technical Report, 20 Sep. 1977 - 31 Dec. 1982
Jule A. Miller Jun. 1983 116 p
(Contract DAAK30-79-C-0045)
(AD-A132448; TACOM-TR-12758) Avail: NTIS HC A06/MF A01 CSCL 13/8

This report describes the development of an automated, computer-controlled, pulsed carbon dioxide laser welding facility for joining of a thin plate gas turbine engine recuperator. Several commercial carbon dioxide laser systems were evaluated for the application, two of them extensively. A detailed analysis and comparison of these systems is given, as is an explanation of the operation of industrial CO2 lasers and the problems involved in their design and application. The computer control of laser welding systems is discussed with particular emphasis on the use of high speed moving mirror systems to deflect the laser beam around irregular shaped joints. Control was obtained at welding speeds up to 100 millimeters per second, while joining the 0.2 millimeter thick nickel based alloy used. Two computer/moving mirror systems were evaluated and programs for each developed. One was in ESSI, a European machine tool language and the other in U.S. computer numerical control language. The program developments work and the problems integration of computer and laser systems are discussed. A detailed cost analysis is given, comparing laser and automated resistant seam welding for this application. An appendix discussing the management advanced manufacturing technology programs is included. GRA

N84-13582# Battelle Columbus Labs., Ohio.
FEASIBILITY OF USING A LARGE PRESS (80,000 - 200,000 TONS) FOR MANUFACTURING FUTURE COMPONENTS ON ARMY SYSTEMS Final Technical Report, 18 Feb. - 18 Jun. 1983
Taylan Altan and S. L. Semiatin Jul. 1983 40 p
(Contract DAAE07-83-M-R028)
(AD-A132398; TACOM-TR-12726) Avail: NTIS HC A03/MF A01 CSCL 13/8

This report summarizes the findings of a study on the potential use of a large press, larger than 59kt, for manufacturing components of the present and future Army Systems. Specifically, the report covers: The technical background on and present status of large press forging technology; The summary and highlights of visits made throughout this study; Other contacts and information sources utilized in the study; Example parts that can be considered for forming/forging in large presses; and potential use of flexible tooling to form armor plate. GRA

N84-13583# Geo-Centers, Inc., Newton, Mass.
MEASUREMENT OF FRICTION AND WEAR ON MODIFIED SURFACES
Aug. 1983 17 p
(Contract N00014-82-C-2092)
(AD-A132364; GC-TR-83-286) Avail: NTIS HC A02/MF A01 CSCL 11/6

The purpose of this study is to investigate two different ion implantation processes which increase the carbon concentration in Ti-implanted steels. Dry sliding friction and wear measurements were used to evaluate the processes and compare them to the original high fluence (50x10 to the 16th power/cm sq) high energy (190 keV) process. In one process, separate implantations of Ti and C were performed at energies resulting in similar depth distribution for Ti (190 keV) and C (50 keV) atoms. In the second, Ti was implanted at an energy considerably lower (50 keV) than used previously (190 keV). A recent study of the energy dependence of the Ti implantation process (11) has shown that at lower energies, vacuum carburization is initiated sooner and a more fully carburized layer is produced at a lower fluence. Compositions of surfaces implanted with Ti ions to a fluence of 2 x10 to the 17th power/cm sq will be presented in order to illustrate the effects of the processing methods on the Ti and C distributions. Author (GRA)

N84-13584# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
WEAR DURING RUBBING OF A SINTERED METAL POWDER BODY M.S. Thesis
John R. Rogacki 1983 114 p
(AD-A132354; AFIT/CI/NR-83-34T) Avail: NTIS HC A06/MF A01 CSCL 11/6

Rub interactions were carried out between an abradable nickel-chromium seal material and titanium alloy blades at slow speeds. Square-ended and negative rake angles blades with blade tip lays parallel and perpendicular to rubbing were fed at six different rates ranging from 0.16 to 100 x .000001 m/pass. The specific energy of seal material displacement increased substantially with feed. A relationship between feed and specific energy of seal material displacement was suggested. The modulus of elasticity of the seal material was found to vary with strain. Results from tensile tests accomplished during this work were combined with data from compression tests to derive a relationship between modulus of elasticity and strain. Based on the results of these tests, it is suggested that the primary mechanism of seal material wear was fatigue. GRA

N84-13585# Sandia Labs., Albuquerque, N. Mex.
THERMAL MODELING OF LASER WELDING WITH A QUASI-1-DIMENSIONAL APPROACH
F. G. Blottner 1983 13 p refs Presented at the Modeling of Casting and Welding Processes Conf., Henniker, N.H., 31 Jul. 1983
(Contract DE-AC04-76DP-00789)
(DE84-001292; SAND-83-1120C; CONF-8307101-1) Avail: NTIS HC A02/MF A01

A relatively simple numerical technique for predicting the melt depth is developed for pulsed laser welding. The two dimensional aspects of the solution are approximated with an effective area in the one dimensional energy equation. The enthalpy method is used with an implicit numerical scheme which provides a rapid solution procedure. A preliminary model of metal absorptivity of the laser radiation is developed but requires some experimental input. For an assumed absorptive model, predictions and measurements are in reasonable agreement for different laser operating conditions. DOE

N84-13586# Tennessee Technological Univ., Cookeville. Dept. of Mechanical Engineering.
DESIGN AND EVALUATION OF SMALL WATER TURBINES Final Report
J. A. Marquis 17 Feb. 1983 53 p refs
(Contract DE-FG44-80R4-10243)
(DE84-000404; DOE/R4-10243/T1) Avail: NTIS HC A04/MF A01

The design and hydromechanical performance characteristics for three basic turbine types: axial flow, inward radial flow and crossflow were evaluated. A single commercially available turbine representative of each type and within the appropriate power range was obtained. Specific turbine selections were based on price, availability and suitability for operation at heads of 50 feet or less and flows under 2 cubic feet per second. With sufficient flow,

however, significant useful power outputs up to 3 hp were obtained. The radial flow turbine had the lowest initial unit cost, the axial and cross flow designs exhibited more stable operation, particularly under transient loadings. The crossflow turbine was essentially self cleaning. DOE

N84-13587# Acurex Corp., Mountain View, Calif.
RESIDUAL SHALE-OIL/DIESEL-ENGINE OPERATING COMPATIBILITY PROGRAM Final Report
Mark Burnett, Craig Derbridge, William Kuby, Humphrey Niven (Ricardo Consulting Engineers, Ltd.), and Roger Richard (Ricardo Consulting Engineers, Ltd.) Oct. 1983 126 p refs
(Contract DE-AC19-80BC-10114)
(DE84-000133; DOE/BC-10114/12) Avail: NTIS HC A07/MF A01

The effective utilization of alternate fuels in medium speed diesel engines was determined. A residual shale oil (RSO) was fired in an APE-Allen, 1000 rpm, 9.5 in. bore diesel engine. Various fuel injection modes were considered. It was determined that the direct firing of 100 RSO gave performance comparable with that using No. 2 diesel fuel. It is found that corrosion and wear of engine components, when using RSO, should be no worse than for standard diesel fuel. The high wax content of RSO requires heating for supply, handling, and injection systems. It is shown that the acetane number of RSO was equivalent to No. 2 diesel. Soft carbon deposits, formed on injectors when using RSO, did not affect performance. The deposit accumulation in combustion chambers and ports is not severe but is greater than standard diesel fuel would produce. DOE

N84-13588# California Univ., Livermore. Lawrence Livermore Lab.
MODELLING THE BEHAVIOR OF MATERIALS
Mark L. Wilkins 12 Aug. 1983 14 p refs Presented at the Computational Eng. Mech. Conf., Dalian, China, 4-10 Sep. 1983
(Contract W-7405-eng-48)
(DE84-000154; UCRL-89709; CONF-8309135-4) Avail: NTIS HC A02/MF A01

The problems of metal plasticity were examined. The plasticity formulation that was used for many years is presented. both plastic yielding and viscous models are covered. It if found that the plasticity formulation offers a numerically simple way of introducing a wide range of material behavior into a calculational program. DOE

N84-13589# California Univ., Livermore. Lawrence Livermore Lab.
FLYWHEEL ROTOR AND CONTAINMENT TECHNOLOGY DEVELOPMENT, FY83
Peter B. Mohr and Carl E. Walter 12 Sep. 1983 8 p refs Presented at the DOE Phys. and Chem. Energy Storage Ann. Contractors Rev. Meeting, Arlington, Va., 12 Sep. 1983
(Contract W-7405-eng-48)
(DE83-017615; UCRL-86557-83; CONF-830974-7) Avail: NTIS HC A02/MF A01

The Flywheel Rotor and Containment Technology Development project was terminated. Activities this year included fabrication, inspection, and test evaluation of rotor and containment structures. A peak energy of 700 Wh was stored at an energy density of 70 Wh/kg. In cyclic tests, 10,000 cycles from design speed to half speed were logged without failure. The first test of a lightweight containment structure indicates the need for additional development. In complementary studies, production cost estimates were made for three flywheel designs. In a cooperative program with the University of Wisconsin, work began on construction of a flywheel/continuously variable transmission/heat engine car which promises fuel economy improvements of up to 100%. Suggestions are made for the direction of future work when interest in flywheel system reappears. DOE

N84-13590# General Electric Co., Philadelphia, Pa. Advanced Energy Programs Dept.
PARAMETRIC TESTING AND EVALUATION OF A FREE-PISTON STIRLING ENGINE/LINEAR-COMPRESSOR SYSTEM
W. Chiu, J. Hogan, and Z. Antoniak 1983 34 p refs Presented at the 18th Intersoc. Energy Conversion Eng. Conf., IECEC '83, Orlando, Fla., 21-26 Aug. 1983
(Contract W-7405-eng-26)
(DE83-017282; CONF-830812-53) Avail: NTIS HC A03/MF A01

A 3 Kw free piston Stirling engine (FPSE) driving a linear Rankine cycle vapor compressor was developed as a low cost activated heat pump (HAHP) for residential applications since 1976. Data obtained from recent testing on the FPSE/linear compressor unit are presented. System performance and engine/compressor matching and control tests and analyses are presented and engine component performance and loss test data are discussed. A description of the low cost real time digital data acquisition system is included. DOE

N84-13591# Calspan Advanced Technology Center, Buffalo, N.Y. Physical Sciences Dept.
STUDY OF THE CONTAINED AIR FLOW IN A RADIAL TIRE: EXPERIMENTAL Final Report
George T. Skinner and William J. Rae Apr. 1983 41 p
(Contract DE-AC02-81ER-10948)
(DE84-000840; CALSPAN-6968-A-2; DOE/ER-10948/T1) Avail: NTIS HC A03/MF A01

The internal air flow in a 14 in radial tire running under load at roadway speed was studied. The experimental apparatus used to obtain velocity profiles is described. An extensive data base was obtained and is presented. Radial traverses were made midway between the sidewalls and at stations displaced two inches towards both the inner and outer sidewalls. These traverses were made at the center of the footprint and at various angles of rotation ahead of and following the footprints. The traverses extended from the rim to within about 0.25 inch from the carcass as the probe passed through the footprint area. The flow field configuration as the air in the cavity passes through the footprint region is shown. DOE

N84-13592# Oak Ridge National Lab., Tenn. Engineering Technology Div.
STIRLING ENGINE PATENTS: INTERNATIONAL PATENT INVENTORY
B. K. Newman Sep. 1983 181 p refs
(Contract W-7405-eng-26)
(DE84-002378; ORNL/CON-119) Avail: NTIS HC A09/MF A01

One hundred seventy-five years of research and development (R and D) in Stirling cycle engines is represented in this international inventory of patent applications. The following lists are included: assignor, assignee, patent numbers, US patent classification, and international patent classification. DOE

N84-13593# Bureau of Mines, Rolla, Mo.
COPPER-MANGANESE-BASE SILVERLESS BRAZING SYSTEMS
V. R. Miller and W. L. Falke Jul. 1983 23 p refs
(PB83-250100; BM-RI-8783; LC-83-60011-2) Avail: NTIS HC A02/MF A01 CSCL 13H

Substitute brazing filler alloys with properties similar to those of silver filler alloys were studied in an effort to conserve silver and reduce hazards from cadmium emissions. Experimental work was conducted first on the commercial silver brazing alloys BAg-1, BAg-1a, BAg-2, and BAg-3 to establish criteria for evaluating the substitute alloys. Properties investigated included the wettability of copper, brass, and steel substrates, and the strength of joints made with the filler alloys. GRA

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N84-13594# British Library Lending Div., Boston Spa (England).
CALCULATION OF THE LIFE OF COMPONENTS OF METAL-

LURGICAL EQUIPMENT FROM THE PARAMETER OF FAILURE PROBABILITY
V. M. Grebenik, G. I. Tolstikov, and V. K. Tsapko 1983 9 p refs Transl. into ENGLISH from Dnepropetrovsk Metallurgical Inst. (USSR)
(BLL-M-35351-(5828.4F)) Avail: British Library Lending Div., Boston Spa, England

The application of the statistical treatment of fatigue test results to the calculation of the life of components of equipment used in the iron and steel industry is considered with special reference to roll life in the cold rolling of tubes. The existence of distribution functions of the life of such rolls enables the probability of their failure to be determined. This probability being known, and with allowance for the danger of such failure to the operating personnel, the labor requirements for replacement, it is possible to set well in advance the optimal roll service life. This enables the stock of spare parts to be planned correctly and the preventive maintenance schedule organized. Author

N84-13595# Laboratorio de Acustica e Sonica, Sao Paulo (Brazil).
TECHNIQUES OF CONDITION MONITORING AND FAULT DIAGNOSIS IN INDUSTRY
L. X. Nepomuceno 1983 159 p refs In PORTUGUESE; ENGLISH summary Presented at the Seminar. Intern. de Manutecao, Sao Paulo, Brazil, 23-25 Aug. 1983
Avail: NTIS HC A08/MF A01

The philosophy of condition monitoring in industry, through the measurement, control and monitoring of some adequate parameters, such as temperature, pressure, oil analysis, a visual examination, measurement and analysis of vibration in terms of displacement, velocity or acceleration depending on the case is presented. Some fundamental ideas of nondestructive testing techniques that are important for an effective maintenance program, and some ideas of the most modern nonconventional processes are presented. The importance of a close contact and discussions with different departments and sections of a generic plant, with the objective of getting all materials and parts using the adequate monitoring parameters in order to keep the whole installation free from nonprogrammed interruption is shown. S.L.

N84-13596# California Univ., Berkeley.
A GENERAL FRAMEWORK FOR LEARNING CURVE RELIABILITY GROWTH MODELS
William S. Jewell Apr. 1983 48 p
(Grant AF-AFOSR-0122-812; AF Proj 2304)
(AD-A132277; ORC-79-11) Avail: NTIS HC A03/MF A01 CSCL 12/1

In reliability growth models, systems undergo an improvement in performance during prototype testing, as design changes are made, and operating procedures and environment are modified. In the learning-curve models, this improvement occurs continuously over time, and there is great interest in predicting the ultimate performance of the system, using only the epochs of the failures which occur early in the testing program. This paper constructs a general framework in which to analyze this problem, including as special cases many different model variations that have previously been analyzed. Numerical trails indicate the difficulty of using classical procedures to estimate ultimate performance; the maximum likelihood estimator is unstable for small testing intervals with a small number of systems on test, and is even inconsistent for a large number of systems. Bayesian procedures are recommended for implementation, as they can use the data from any testing protocol. Author (GRA)

N84-13597# Sandia Labs., Albuquerque, N. Mex.
SIZING DEFECTS USING ANNULAR-ARRAY TECHNIQUES WITH AN AUTOMATED ULTRASONIC DATA-ACQUISITION SYSTEM
J. H. Gieske, G. C. Stoker, and P. D. Walkington 1983 15 p refs Presented at the Conf. on Quantitative NDE, Santa Cruz, Calif., 7 Aug. 1983
(Contract DE-AC04-76DP-00789)
(DE84-001644; SAND-83-0971; CONF-830811-16) Avail: NTIS HC A02/MF A01

The results of sizing internal flaws by a annular phased array technique are presented. The data were obtained by microprocessor controlled phased array pulser/receiver operated with a minicomputer ultrasonic data acquisition system. Flat bottom holes of two sizes which were machined in an aluminum block at various depths were used as targets. Sizing of these targets by the annular array technique is compared with sizing by conventional flat and focused single transducer techniques. It is shown that the measured flaw size determined by the annular array technique is to a large extent independent of echo amplitude and flaw depth. DOE

N84-13598# Ames Lab., Iowa.
ELASTIC-WAVE SCATTERING FROM MULTIPLE VOIDS (POROSITY)
D. O. Thompson, S. J. Wormely, James H. Rose, and R. B. Thompson 1983 16 p refs Presented at the Rev. of Progr. in Quantitative NDE, Santa Cruz, Calif., 7-12 Aug. 1983
(Contract W-7405-eng-82)
(DE83-018076; IS-N-449; CONF-830811-11) Avail: NTIS HC A02/MF A01

The ultrasonic technique that which provides a way to determine certain characteristics of a distribution of voids (porosity) in materials is discussed. The technique is one sided, it does not depend upon the reflection of back surface echoes to obtain the results, and appears to have potential practical value in difficult inspection geometries. The effects can be accounted for so long as the grain size is reasonably uniform. It is expected that less concentrated void distributions can be characterized by this method. The upper limit of validity is determined by the void density at which multiple scattering events must be taken into account. DOE

N84-13599# Ames Lab., Iowa.
EFFECTS OF CRACK CLOSURE ON ULTRASONIC TRANSMISSION
R. B. Thompson, B. J. Skillings, L. W. Zachary, L. W. Schmerr, and O. Buck 1983 17 p refs Presented at the Conf. on Rev. of Progr. in Quantitative NDE, Santa Cruz, Calif., 7-12 Aug. 1983
(Contract W-7405-eng-82)
(DE83-018073; IS-M-456; CONF-830811-7) Avail: NTIS HC A02/MF A01

The effects of partial crack closure on focussed, through transmission ultrasonic signals were investigated. A gradual transition from a fully closed crack condition at the crack tip to an essentially fully open condition at a distance of a few mm from the tip, with additional localized contact along the length of the crack is shown. The model relates width and separation of asperity contacts to the frequency dependence of the ultrasonic reflection and transmission. These measurements were supplemented by tests in which water infiltrated into the crack opening. The frequency spectra of the ultrasonic transmitted signals for this case are used to estimate the average COD at various points along the crack length. DOE

N84-13600# California Univ., Livermore. Lawrence Livermore Lab.
PENETRANT AND MAGNETIC-PARTICLE INSPECTION FOR MATERIAL INTEGRITY
R. H. Bossi and J. R. Ambrosino 25 Aug. 1983 14 p
(Contract W-7405-eng-48)
(DE83-017830; UCID-19824) Avail: NTIS HC A02/MF A01

Penetrant and magnetic particle inspection services which are two techniques used on materials and fabricated parts to test for surface or near surface cracks and defects that may limit serviceability are discussed. The use of these methods assures a trouble free service life, improves safety, and is cost effective. The inspection of material at appropriate stages of fabrication can result in real saving of time and effort by detecting potentially

unusable material before extensive machining and finishing are performed. DOE

N84-13601# California Univ., Livermore. Lawrence Livermore Lab.
MICROWAVE NONDESTRUCTIVE EVALUATION OF COMPOSITES
R. J. King and P. Stiles Aug. 1983 11 p refs Presented at the Conf. on Quantitative NDE, Santa Cruz, Calif., 7-12 Aug. 1983
(Contract W-7405-eng-48)
(DE84-001777; UCRL-89922; CONF-830811-17) Avail: NTIS HC A02/MF A01

Microwaves are used to measure the presence of minute amounts of diffused moisture in dielectric materials. The presence of such moisture is thought to be a diagnostic indicator of the structural integrity and aging of composites. The chief objective here is to demonstrate the feasibility of using an open ended coaxial resonator to monitor moisture. DOE

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N84-13602# Defence Research Information Centre, Orpington (England).
WELDING DEFORMATIONS AND RESIDUAL STRESSES DUE TO CIRCUMFERENTIAL WELDING OF CYLINDRICAL SHELLS AND HEMISPHERICAL END PLATES
Y. Fujita, T. Nomoto, and H. Hasegawa 25 Oct. 1983 13 p Transl. into ENGLISH from J. Japanese Welding Soc. (Japan), v. 50, no. 8, 1981 p 731-736
(DRIC-T-6968; BR-89448) Avail: British Library Lending Div., Boston Spa, Engl.

The welding deformations and residual stresses due to circumferential welding of cylindrical shells and hemispherical end plates are discussed. A one dimensional thermal elastic-plastic analysis using the Rayleigh-Ritz method is applied to the axisymmetric thermal stress problems of thin cylindrical and spherical shells. The influence of shell size and welding heat input on welding deformations and residual stresses, and of the effectiveness of proposed design charts is outlined. E.A.K.

N84-13603 California Inst. of Tech., Pasadena.
ANALYSIS AND CONTROL OF QUASI DISTRIBUTED PARAMETER SYSTEMS Ph.D. Thesis
Chuen Jin Goh 1983 144 p
Avail: Univ. Microfilms Order No. DA8312044

As engineering systems become larger and more flexible, serious consideration must be given to the very high order, and consequently very high bandwidth, of these so called quasidistributed parameter sytems. In particular, as practical active control devices such as sensors and actuators have finite bandwidth, great care must be exercised so that control of low frequency modes does not cause instability of intermediate and high frequency modes. The nature of these stability problems is investigated in the context of direct velocity feedback control, and approximate bounds on the diagonal elements of the modal gain matrix are derived. Two velocity feedback techniques are proposed to alleviate potential instability, but these are independent on the natural damping of the system, which remains uncertain in practice. Another technique using position feedback is considered. Despite certain additional complications, position feedback control proves to be more advantageous in many ways than velocity feedback. The feasibility of these theoretical techniques are confirmed by means of a numerical simulation on a simply supported discrete shear beam. Dissert. Abstr.

N84-13604 California Inst. of Tech., Pasadena.
THE PROPAGATION AND ARREST OF AN EDGE CRACK IN AN ELASTIC HALF-SPACE UNDER CONDITIONS OF ANTI-PLANE SHEAR: ANALYTICAL AND NUMERICAL RESULTS Ph.D. Thesis
Timothy Christopher OSullivan 1983 73 p
Avail: Univ. Microfilms Order No. DA8312059

The motion of an edge crack extending nonuniformly in an elastic half space under conditions of antiplane shear is analyzed. An expression for the stress intensity factor at the crack tip is obtained, and an energy balance crack propagation criterion is used to find the equation of motion of the tip. On solving this equation numerically, it is found that crack arrest occurs before the second reflected wave from the boundary reaches the tip. Also a numerical procedure for studying antiplane shear crack propagation problems using finite differences is developed. To approximate the elastodynamic field as accurately as possible near the moving crack tip, where singular stresses occur, the local asymptotic displacement field near the tip is incorporated into the finite difference scheme. The numerical procedure is applied to the edge crack problem analyzed in the first part of this study, and the numerical and exact results are compared. Dissert. Abstr.

N84-13605 California Univ., Los Angeles.
OPTIMIZATION OF STRUCTURES SUBJECTED TO PERIODIC LOADS Ph.D. Thesis
William C. Mills-Curran 1983 177 p
Avail: Univ. Microfilms Order No. DA8312026

The problem of optimal design of damped linear structures subjected to periodic loading with constraints on maximum deflections of the structure and with side constraints on the design variables is examined. Attention is focused on two major impediments to an optimal solution. First, an upper bound expression is formed to replace the time parametric dynamic displacement constraint. Second, a method is proposed to overcome the severe nonconvexities of the design space, which are caused by resonance peaks, occurring whenever a natural frequency of the structure approaches a loading frequency during optimization. These two methods are combined in a research computer program which is used to solve several beam grillage type test problems. The results show that the problem of the disjoint design space can be treated effectively by a rational automated design procedure.
Dissert. Abstr.

N84-13606# British Library Lending Div., Boston Spa (England).
APPROXIMATE SOLUTION OF THE PROBLEM OF THERMOELASTICITY OF A SPHERE WITH VARIABLE PROPERTIES
Yu. S. Postolnik 1983 8 p refs Transl. into ENGLISH from report of Dneprodzerzninsk Industrial Inst., (USSR)
(BLL-M-35369-(5828.4F)) Avail: British Library Lending Div., Boston Spa, England

A general approximate analytical solution is derived for the problem of the thermoelasticity of a hollow sphere with temperature dependent mechanical properties. The results obtained enable the thermal stressed state of metal in the form of a sphere to be considered for specific heating conditions in continuous furnaces.
Author

N84-13607*# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Civil Engineering.
THREE-DIMENSIONAL ANALYSIS OF CHEVRON-NOTCHED SPECIMENS BY BOUNDARY INTEGRAL METHOD Final Report
Alexander Mendelson and Louis Ghosn Sep. 1983 107 p refs (Contract NAG1-304)
(NASA-CR-172225; NAS 1.26:172225) Avail: NTIS HC A06/MF A01 CSCL 20K

The chevron-notched short bar and short rod specimens was analyzed by the boundary integral equations method. This method makes use of boundary surface elements in obtaining the solution. The boundary integral models were composed of linear triangular and rectangular surface segments. Results were obtained for two specimens with width to thickness ratios of 1.45 and 2.00 and for

different crack length to width ratios ranging from 0.4 to 0.7. Crack opening displacement and stress intensity factors determined from displacement calculations along the crack front and compliance calculations were compared with experimental values and with finite element analysis. E.A.K.

N84-13608*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STABILITY, VIBRATION AND PASSIVE DAMPING OF PARTIALLY RESTRAINED IMPERFECT COLUMNS
Zia Razzaq, R. T. Voland, H. G. Bush, and M. M. Mikulas, Jr. Oct. 1983 38 p refs
(NASA-TM-85697; NAS 1.15:85697) Avail: NTIS HC A03/MF A01 CSCL 20K

A theoretical and experimental study of slender tubular columns for possible use in space structures is conducted in the presence of partial rotational end restraints. Explicit formulas are derived for computing the buckling load and the lowest natural frequency of perfectly straight uniform elastic members with rotational end restraints possessing linear moment-rotation characteristics. An exact solution in the form of a transcendental equation, and a numerical solution using second-order finite-differences are also presented. The presence of an initial imperfection is also incorporated into the numerical procedure. Vibration tests are conducted on an imperfect tubular steel member in the absence of an axial load. A damping concept consisting of a string-mass assembly is explored. Three passive damping configurations involving combinations of three lead shots were investigated. The three lead shot configurations provided considerably greater damping than the single lead shot. Author

N84-13609*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RESTRICTED MAXIMUM PRINCIPLES FOR ELASTIC BODIES Final Report
Milton E. Rose Oct. 1983 8 p refs
(Contract NAS1-17070)
(NASA-CR-172255; NAS 1.26:172255) Avail: NTIS HC A02/MF A01 CSCL 20K

A maximum principle for the equilibrium of an elastic material body which is free of body forces is described not all of the components of the displacement vector or of the principal stresses can simultaneously have a strict maximum or minimum at any point in the body which does not be either on the surface or on a material interface. S.C.L.

N84-13610*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
AN IMPROVED FINITE-DIFFERENCE ANALYSIS OF UNCOUPLED VIBRATIONS OF TAPERED CANTILEVER BEAMS
K. B. Subrahmanyam (NBKR Inst. of Science and Technology) and K. R. V. Kaza Sep. 1983 39 p refs
(NASA-TM-83495; E-1826; NAS 1.15:83495) Avail: NTIS HC A03/MF A01 CSCL 20K

An improved finite difference procedure for determining the natural frequencies and mode shapes of tapered cantilever beams undergoing uncoupled vibrations is presented. Boundary conditions are derived in the form of simple recursive relations involving the second order central differences. Results obtained by using the conventional first order central differences and the present second order central differences are compared, and it is observed that the present second order scheme is more efficient than the conventional approach. An important advantage offered by the present approach is that the results converge to exact values rapidly, and thus the extrapolation of the results is not necessary. Consequently, the basic handicap with the classical finite difference method of solution that requires the Richardson's extrapolation procedure is eliminated. Furthermore, for the cases considered herein, the present approach produces consistent lower bound solutions. Author

N84-13611# National Aerospace Lab., Tokyo (Japan).
TENSILE STRENGTH OF PRESSURELESS-SINTERED SILICON NITRIDE AT ELEVATED TEMPERATURE
Katsutoshi Matsusue, Yoshiaki Fuisawa, and Kitao Takahara 1983 17 p refs In JAPANESE; ENGLISH summary
(NAL-TR-753; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Uniaxial tensile strength tests of pressureless-sintered silicon nitride were carried out in air at temperatures ranging from room temperature up to 1600 C. Silicon nitrides containing Y2O3, Al2O3, Al2O3, MgO or MgO, CeO2 additives were tested. The results show that the composition of the additive used influences the strength characteristics of the silicon nitride. The tensile strength rapidly decreased at temperatures above 800 C for the materials containing MgO as the additive and above 1000 C for the material with Y2O3. When the temperature increased to as high as 1300 C, the strength decreased to about 10 percent of the room temperature strength in each case. Observations of the fracture origin and of the crack propagation on the fracture surfaces discussed. Author

N84-13612# National Aerospace Lab., Tokyo (Japan).
STRAIN ANALYSIS OF THIN COMPOSITES WITH MOIRE METHOD
Shinichi Koshide, Hideo Takamatsu, and Moritaka Nagasaki 1983 16 p refs In JAPANESE; ENGLISH summary
(NAL-TR-754; ISSN-0389-4041) Avail: NTIS HC A02/MF A01

The strain analysis of ultrathin composites by Moire method is described. The method was applied to strain analysis for tensile tests and creep tests of two kinds of thin materials which were manufactured for trial use in balloon satellite structures. The materials are thin polyestel sheets reinforced with glass fiber cloth and thin composites consisting of polyethylene terephtalate film sandwiched between two layers of aluminum foil. It is indicated that the method is applicable to strain analysis and flaw detection in ultrathin materials and mechanical properties of these thin composites are clarified. E.A.K.

N84-13613# Southampton Univ. (England). Inst. of Sound and Vibration Research.
THE DYNAMIC IN PLANE RESPONSE AT THE CENTRE OF A ROTATING ELASTIC DISC DUE TO OSCILLATORY IN PLANE FORCES AT THE RIM
R. J. Pinnington Oct. 1982 59 p refs Sponsored by the Admiralty Marine Technology Establishment
(ISVR-TR-121) Avail: NTIS HC A04/MF A01

The vibration response at the center of a rotating disc which is subjected to in-plane, normal and tangential forces at the rim is analyzed. Such a disc will, of course, behave as a rigid body at low frequencies, with the acceleration at the center in phase with force at the rim. However, to analyse the response at higher frequencies it is necessary to consider wave motion within the disc. The inplane vibration of an elastic solid media arises from independent contributions of two types of wave motion, namely dilatational waves (which are equivalent to acoustic pressure waves in a liquid), and rotational (or shear) waves. The vibration analysis of the disc therefore involves two uncoupled wave equations (associated with each wave type), expressed in plane polar co-ordinates. The general solution to each of these equations is a summation of orthogonal modes. Each mode has a Bessel function variation of order n in the radial direction and a sin theta or cos theta variation with the circumferential direction (where n is an integer between 0 and infinity). S.L.

N84-13614*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THEORETICAL BASIS FOR DESIGN OF THERMAL-STRESS-FREE FASTENERS
Max L. Blosser and Robert R. McWithey Dec. 1983 24 p refs
(NASA-TP-2226; L-15658; NAS 1.60:2226) Avail: NTIS HC A02/MF A01 CSCL 20K

A theoretical basis was developed for the design of fasteners which are free of thermal stress. A fastener can be shaped to eliminate the thermal stress which would otherwise result from differential thermal expansion between dissimilar fastener and sheet materials for many combinations of isotropic and orthotropic

materials. The resulting joint remains snug, yet free of thermal stress at any temperature, if the joint is uniform in temperature, if it is frictionless, and if the coefficients of thermal expansion of the materials do not change with temperature. In general, such a fastener has curved sides; however, if both materials have isotropic coefficients of thermal expansion, a conical fastener is free of thermal stress. Equations are presented for thermal stress free shapes at both initial and final temperature, and typical fastener shapes are shown. Author

N84-13615# Naval Postgraduate School, Monterey, Calif.
PROBABILISTIC FATIGUE LIFE PREDICTIONS OF STRUCTURAL COMPONENTS IN HIGH-CYCLE FATIGUE REGIMES M.S. Thesis
Richard W. Lukens Jun. 1983 144 p
(AD-A132425) Avail: NTIS HC A07/MF A01 CSCL 20/11

A principal mode of failure of structural components in mechanical systems is fatigue. One method of predicting the probability of fatigue failure of a structural component is to determine the probability that the calculated cumulative fatigue damage index is greater than the critical damage index at failure. The cumulative fatigue damage is represented as a random variable, and the critical damage index is represented by the statistical variance of existing experimental data. A FORTRAN computer code using this failure criteria is presented, which calculates the probability of failure for a structural component in the high-cycle fatigue regime under a random stress response environment, using both the Weibull and log-normal statistical distribution models. The Weibull model has been found to be the more conservative model in the low probability of failure region, which is consistent with failure predictions between the two models using the classical failure criteria of cyclic life. Author (GRA)

N84-13616# California Inst. of Tech., Pasadena. Div. of Engineering and Applied Science.
THE EMERGENCE AND PROPAGATION OF A PHASE BOUNDARY IN AN ELASTIC BAR
Thomas James Pence Jun. 1983 127 p
(Contract N00014-75-C-0196)
(AD-A132275; TR-52) Avail: NTIS HC A07/MF A01 CSCL 20/11

This dissertation is concerned with the dynamical analysis of an elastic bar whose stress-strain relation is not monotonic. Sufficiently large applied loads then require the strain to jump from one ascending branch of the stress-strain curve to another such branch. For a special class of these materials, a nonlinear initial-boundary value problem in one-dimensional elasticity is considered for a semi-infinite bar whose end is subjected to either a monotonically increasing prescribed traction or a monotonically increasing prescribed displacement. If the stress at the end of the bar exceeds the value of the stress at any local maximum of the stress-strain curve a strain discontinuity or phase boundary emerges at the end of the bar and subsequently propagates into the interior. For classically smooth solutions away from the phase boundary, the problem is reducible to a pair of differential-delay equations for the two unknown functions of a single variable. The first of these two functions gives the location of the phase boundary, while the second characterizes the dynamical fields in the high-strain phase of material. Estimates for the various dynamical field quantities are given and a priori conditions are deduced which determine whether the phase boundary eventually becomes the leading disturbance. GRA

N84-13617# Naval Postgraduate School, Monterey, Calif.
THE EFFECTS OF ENVIRONMENT AND DWELL ON HIGH TEMPERATURE FATIGUE CRACK GROWTH OF 2 1/4 Cr - 1 Mo STEEL M.S. Thesis
John S. Kamen Jun. 1983 118 p
(AD-A132147; AD-E850405) Avail: NTIS HC A06/MF A01 CSCL 11/6

The effects of the environment and dwell periods on fatigue crack growth rates at 525 C for both annealed and normalized and tempered 2 1/4 Cr - 1 Mo steel in high strain fatigue (HSF) and linear elastic fracture mechanics (LEFM) regimes in air and in vacuum have been examined using optical and scanning electron microscopy techniques. Fatigue crack propagation rates were determined and were found to vary with the environment and the loading waveform used in the tests. At small crack depths in HSF, oxidation in air increased cyclic crack growth rates by over an order of magnitude compared with vacuum. For continuous cycling tests at a frequency of 0.01 Hz, and tests with a peak tension, compression, or tension plus compression dwell cycling, the rates were similar. The fastest crack growth in air occurred during cycles having both tension and compression dwell periods. Fractographs were analyzed in attempts to understand the reasons for the different propagation rates. Evidence suggesting partial rewelding of the crack surfaces during compressive dwell periods in vacuum and a change in fracture mode from transgranular to a branching intergranular like fracture when the environment was changed from air to vacuum were observed. Author (GRA)

N84-13618# Massachusetts Inst. of Tech., Cambridge. Nuclear Reactor Lab.
MINIATURIZED DISK BEND TESTS OF NEUTRON-IRRADIATED PATH A TYPE ALLOYS
M. Lee, D. S. Sohn, N. J. Grant, and O. K. Harling 1983 5 p refs Presented at the 3rd Top. Meeting on Fusion Reactor Mater., Albuquerque, N.Mex., 19 Sep. 1983
(Contract DE-AC02-78ER-10107)
(DE84-001277; DOE/ER-10107/20) Avail: NTIS HC A02/MF A01

Path A Prime Candidate Alloy (PCA) was rapidly solidified and consolidated by extrusion. Twenty percent CW samples, precision TBM disks, 3 phi x 0.254 mm, were irradiated in the mixed flux of the HFIR reactor up to approx. 8.5 dpa (360 appm He) and approx. 34 dpa (3100 appm He) at 300, 400, 500 and 6000 C. Similar samples of conventionally processed PCA were also irradiated for comparison. Mechanical properties were characterized using a miniaturized disk bend test (MDBT). Major decreases in strength and ductility especially fo the 500 and 6000 C irradiations are indicated. No major differences were found between a rapidly solidified and extruded PCA type alloy and conventionally processed PCA. DOE

N84-13619# Sandia Labs., Albuquerque, N. Mex.
ALTERNATIVE SHOCK CHARACTERIZATIONS FOR CONSISTENT SHOCK-TEST SPECIFICATION
T. J. Baca 1983 38 p refs Presented at 54th Shock and Vibration Symp., Pasadena, Calif., 18 Oct. 1983
(Contract DE-AC04-76DP-00789)
(DE84-000482; SAND-83-1372C; CONF-8310166-1) Avail: NTIS HC A03/MF A01

Three methods of analyzing transient acceleration time histories which represent promising alternatives to shock response spectra as the basis for deriving consistent shock test specifications were evaluated. The limitations of shock spectra are discussed. The shock analysis techniques include: (1) ranked peaks in the acceleration time history; (2) root mean square acceleration as a function of time; and (3) root mean square acceleration as a function of frequency. These shock characterizations provide the parameters necessary to develop a new shock test specification technique. The new method of shock test specification is demonstrated using drop table and decaying sinusoid shock test inputs. Test specificatons using the standard method of shock spectrum enveloping are also derived. Beneficial aspects of utilizing these alternative shock analysis techniques instead of shock spectra are presented and the evaluation of conservatism associated with different shock test specification techniques is emphasized. DOE

N84-13620# Rockwell International Corp., Thousand Oaks, Calif.
DETECTION OF CLOSED INTERNAL FATIGUE CRACKS
B. R. Tittmann, L. Ahlberg, O. Buck (Ames Lab., Iowa), F. Cohen-Tenoudji (Paris-VII Univ.), and G. Quentin (Paris-VII Univ.) 1983 12 p refs Presented at the Conf. on Quantitative NDE, Santa Cruz, Calif., 7-12 Aug. 1983
(DE83-017686; IS-M-443; CONF-830811-3) Avail: NTIS

HC A02/MF A01

The detection and sizing of closed internal fatigue cracks by ultrasonic techniques was reviewed. The diffraction of shear waves at the crack tip was emphasized. Both fully open as well as partially closed cracks were considered. The effect of crack closure stress on backscattered shear waves was studied with the aid of an Al compact tension specimen. Noticeable changes with crack closure stress were documented for the structure of both the time domain and frequency domain representations. The techniques acquired with this specimen were applied to the study of a 50 (SIGMA)m radius semicircular crack internal to a diffusion bonded Ti-alloy plate. Improved signal processing techniques were employed to detect the crack and to distinguish it from an artificial surface crack. The probability of detection was measured as a function of crack interrogation angle and crack closure stress to provide data on optimum probability for detection and sizing. DOE

N84-13621# Ames Lab., Iowa.
ABSOLUTE DETERMINATION OF STRESS IN TEXTURED MATERIALS
R. B. Thompson, J. F. Smith, and S. S. Lee 1983 16 p refs Presented at the Conf. on Quantitative NDE, Santa Cruz, Calif., 7-12 Aug. 1983
(Contract W-7405-eng-82)
(DE83-018083; IS-M-448; CONF-830811-15) Avail: NTIS HC A02/MF A01

The continuous theory of elastic wave propagation in deformed, anisotropic solids is reviewed. The features which might be used to distinguish between stress induced changes in ultrasonic velocity and change due to material anisotropy are emphasized. The difference in velocity of two shear waves, whose directions of propagation and polarization have been interchanged were noted when these directions fall along the symmetry axes of a rolled plate. The applicability of continuum theory to heterogeneous engineering materials such as metal polycrystals is discussed using previously reported stress dependencies of ultrasonic velocities. Experiments are described. A possible configuration for using the effect to measure the value of a uniform stress in a plate of unknown texture is proposed. DOE

N84-13622# Sandia Labs., Albuquerque, N. Mex.
STRUCTURAL ANALYSIS OF A GLASS/SPACE FRAME PARABOLIC-TROUGH SOLAR COLLECTOR FOR VARIOUS OPERATING POSITIONS
James R. Koteras Oct. 1983 33 p refs
(Contract DE-AC04-76DP-00789)
(DE84-001137; SAND-82-1040) Avail: NTIS HC A03/MF A01

The stresses due to gravity in the reflective panels of a parabolic trough solar collector were determined for various operating positions. Combined wind and gravity loads are considered for one of the operating positions. The reflective panels which make up the troughs use glass as the reflecting medium and also as the major structural component. To determine the stresses, a finite element model was constructed for a collector string. The maximum and minimum stresses do not show large variations for the various operating positions. The stress results for show that the design should survive wind and gravity loads for all of its operating positions. Analyses of the panel design as it evolved are discussed. These analyses indicated that the basic geometry is the driving force for determining the overall stress pattern and the magnitudes of the stresses. DOE

N84-13623# Earthquake Engineering Research Inst., Berkeley, Calif.
INELASTIC ANALYSIS OF PIPING AND TUBULAR STRUCTURES
Mana Mahasuverachai and Graham H. Powell Nov. 1982 147 p refs
(Grant NSF CEE-81-05790)
(PB83-249987; UCB/EERC-82/27; NSF/CEE-82118) Avail: NTIS HC A07/MF A01 CSCL 13K

The fiber procedure is used to model the inelastic behavior of three pipe sections: a straight pipe element assuming a cubic shape function, a curved pipe element based on a combination of beam and shell theories, and a straight pipe element which automatically determines an appropriate shape function as the analysis progresses. The models are suitable for modeling straight and curved segments, respectively, in piping systems, assuming closely-spaced nodes. They also include options for the effect of internal pressure and temperature change. They are incorporated into the computer programs ANSR and WIPS. A third model has been incorporated into ANSR. The elements are all applicable for either small or large displacements analysis. A number of example elements are analyzed to assess their applications. GRA

N84-13412*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NASTRAN STRUCTURAL MODEL FOR THE LARGE 64-METER ANTENNA PEDESTAL. PART 2: IMPROVED MODEL
C. T. Chian *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 105-113 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 20K

42 GEOSCIENCES (GENERAL)

N84-13624# Department of Energy, Upton, N.Y. Engineering, Mathematics and Geosciences Div.
SUMMARIES OF PHYSICAL RESEARCH IN THE GEOSCIENCES
Sep. 1983 122 p refs
(DE83-017885; DOE/ER-0145/1) Avail: NTIS HC A06/MF A01

The scope of the individual geoscience programs and the research performed during 1982 to 1983 are described. The geoscience research program includes research in geology, petrology, geophysics, geochemistry, hydrology, solar terrestrial relationships, aeronomy, seismology, and natural resourc analysis, including the various subdivisions and interdisciplinary areas. DOE

N84-13625# California Univ., Livermore. Lawrence Livermore Lab. Dept. of Earth Science.
KRIGING OF GEOLOGICAL AND PHYSICAL PARAMETERS FROM YUCCA FLAT, NTS
N. H. Mao May 1983 77 p refs
(Contract W-7405-eng-48)
(DE83-018227; UCID-19880) Avail: NTIS HC A04/MF A01

Kriging was applied to various geological and physical parameters from Yucca Flat at the Nevada Test Site. The uncertainty of an estimate for the depth to the tuff pre Cenozoic rock contact is about 81 m and for the depth to the alluvium tuff contact is about 38 m. Physical parameters of mixed alluvium were kriged and showed systematic variations. Various approaches to improve the estimates are outlined. The performance of kriging was tested by using digitized topographic data. The results from the kriging validation process are fair representation of the overall uncertainty. An empirical equation is proposed to calculate the estimated uncertainty from the data variance and number of data points. DOE

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N84-13626 California Univ., San Diego.
A VARIATIONAL METHOD FOR ESTIMATING THE GENERAL CIRCULATION IN THE OCEAN Ph.D. Thesis
Christine Eliane Provost 1983 106 p
Avail: Univ. Microfilms Order No. DA8315180

The idea is to minimize some measure of roughness (to obtain a smooth field) while fitting the data and obeying a set of dynamical constraints within prescribed misfits. These prescribed departures of the solution from the data and from the dynamics recognize the presence of time-varying and small scale motions in the data and the inappropriateness of the simplified dynamics. The variational technique has three important advantages: (A) the relative emphasis on the smoothing, data and dynamics can be easily changed by altering a single parameter, the corresponding Lagrange multiplier. (B) the estimate is produced by global optimization. The unknowns (3 components of the velocity field) are continuous and are estimated at every point simultaneously in the 3-d domain by demanding overall consistency. (C) only the total misfit is specified for each constraint, and it can be distributed in any way to achieve overall consistency. Dissert. Abstr.

N84-13627*# Reading Univ. (England). Dept. of Geography.
THE UNITED KINGDOM SATMAP PROGRAM Progress Report
John R. Towshend, Janis Cushnie, Paula Atkinson, John Hardy, Andrew Wilson, Andrew Harrison, John Baker, and Michael Jackson [1983] 46 p Prepared in cooperation with Natural Environment Research Council, Swindon, England Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E84-10002; NASA-CR-174517; NAS 1.26:174517) Avail: NTIS HC A03/MF A01 CSCL 05B

Data from test tapes from the United States (specifically the August Arkansas scene) and the first tape of the UK test site which came from ESRIN are analyzed. Methods for estimating spatial resolution are discussed and some preliminary results are included. The characteristics of the ESRIN data are examined and the utility of the various spectral bands of the thematic mapper for land cover mapping are outlined. A.R.H.

N84-13628*# Agricultural Research Center, Beltsville, Md. Hydrology Lab.
INFORMATION CONTENT OF DATA FROM THE LANDSAT 4 THEMATIC MAPPER (TM) AND MULTISPECTRAL SCANNER (MSS) Progress Report
John C. Price [1983] 4 p ERTS
(NASA Order S-10772-C)
(E84-10034; NASA-CR-174586; NAS 1.26:174586; PR-4) Avail: NTIS HC A02/MF A01 CSCL 05B

Simultaneous data acquisition by the LANDSAT 4 thematic mapper and the multispectral scanner permits the comparison of the two types of image data with respect to engineering performance and data applications. Progress in the evaluation of information content of matching scenes in agricultural areas is briefly reported. M.G.

N84-13629*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
LANDSAT 4 IMAGE DATA QUALITY ANALYSIS Quarterly Progress Report, 10 Aug. - 9 Nov. 1983
P. E. Anuta 9 Nov. 1983 5 p ERTS
(Contract NAS5-26859)
(E84-10036; NASA-CR-174588; NAS 1.26:174588; LARS-CR-110983) Avail: NTIS HC A02/MF A01 CSCL 05B

A comparative analysis of TM and MSS data was completed and the results indicate that there are half as many separable spectral classes in the MSS data than in TM. In addition, the minimum separability between classes was also much less in MSS data. Radiometric data quality was also investigated for the TM by computing power spectrum estimates for dark-level data from Lake Michigan. Two significant coherent noise frequencies were observed, one with a wavelength of 3.12 pixels and the other with a 17 pixel wavelength. The amplitude was small (nominally .6 digital count standard deviation) and the noise appears primarily in Bands 3 and 4. No significant levels were observed in other bands. Scan angle dependent brightness effects were also evaluated. M.G.

N84-13630*# Systems and Applied Sciences Corp., Silver Spring, Md.
THE USE OF LINEAR FEATURE DETECTION TO INVESTIGATE THEMATIC MAPPER DATA PERFORMANCE AND PROCESSING
Charlotte M. Gurney [1983] 15 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Contract NAS5-27393)
(E84-10037; NASA-CR-174589; NAS 1.26:174589) Avail: NTIS HC A02/MF A01 CSCL 08B

The geometric and radiometric characteristics of thematic mapper data through analysis of linear features in the data are investigated. The particular aspects considered are: (1) thematic mapper ground IFOV; (2) radiometric contrast between linear features and background; (3) precision of system geometric correction; (4) band-to-band registration; and (5) potential utility of TM data for linear feature detection especially as compared to MSS data. It is shown that TM data may be used to estimate TM pixel size and to illustrate band-band mis-registration. Further, the geometry and radiometry of the data are sufficiently precise to allow accurate estimation of the widths of linear features. In optimum conditions features one quarter of a pixel in width may be accurately measured. These results have considerable potential for applications for hydrological and topographic mapping. M.G.

N84-13631*# Natural Environment Research Council, London (England).
THE USE OF THEMATIC MAPPER DATA FOR LAND COVER DISCRIMINATION: PRELIMINARY RESULTS FROM THE UK SATMAP PROGRAMME
M. J. Jackson, J. R. Baker, J. R. G. Townshend, J. E. Gayler, and J. R. Hardy [1983] 17 p refs Prepared in cooperation with Reading Univ., England Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E84-10038; NASA-CR-174590; NAS 1.26:174590) Avail: NTIS HC A02/MF A01 CSCL 08B

The principal objectives of the UK SATMaP program are to determine thematic mapper (TM) performance with particular reference to spatial resolution properties and geometric characteristics of the data. So far, analysis is restricted to images from the U.S. and concentrates on spectra and radiometric properties. The results indicate that the data are inherently three dimensional compared with the two dimensional character of MSS data. Preliminary classification results indicate the importance of the near infrared band (TM 4), at least one middle infrared band (TM 5 or TM 6) and at least one of the visible bands (preferably either TM 3 or TM 1). The thermal infrared also appears to have discriminatory ability despite its coarser spatial resolution. For band 4 the forward and reverse scans show somewhat different spectral responses in one scene but this effect is absent in the other analyzed. From examination of the histograms it would appear that the full 8-bit quantization is not being effectively utilized for all the bands. M.G.

N84-13632*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
GEOLOGIC SURVEY IN THE SOUTH-CENTRAL REGION OF MATO GROSSO [CAMINHAMENTO GEOLOGICO NA REGIAO CENTRO-SUL DE MATO GROSSO]
Nelson de Jesus Parada, Principal Investigator and Milton Garcia Baleiro Jul. 1983 189 p refs In PORTUGUESE; ENGLISH summary Sponsored by NASA ERTS
(E84-10039; NASA-CR-174591; NAS 1.26:174591) Avail: NTIS HC A09/MF A01 CSCL 05B

The field observations made in the Cuiaba Project area are described. Many geologic cross-sections were done in which the stratigraphic units and the geologic structures defined in the literature and observed in the LANDSAT MSS imagery were recognized. Author

N84-13633*# Georgia Univ., Athens. Dept. of Geography.
COMPARATIVE ASSESSMENT OF LANDSAT-4 MSS AND TM DATA QUALITY FOR MAPPING APPLICATIONS IN THE SOUTHEAST
R. Welch 7 Jan. 1983 3 p Sponsored by NASA ERTS
(E84-10040; NASA-CR-174592; NAS 1.26:174592) Avail: NTIS HC A02/MF A01 CSCL 05B

The initial objectives of analyses of the MSS data are two-fold: (1) to evaluate the geodetic accuracy of CCT-P data of the test sites; and (2) to improve the geodetic accuracy by additional processing if the original data either do not meet pre-launch specifications or mapping requirements. The location of 45 ground control points (GCP) digitized from 35 U.S. Geological Survey 1:24,000 scale quadrangles (UTM coordinates) were identified in terms of pixel and scan line values. These 46 points are used to establish UTM position error vector distributions in the scene. As an initial check on the geometric reliability of the MSS data, 28 well-distributed GCPs were input to a program which compares the scaled image distances between all possible point pairs with the corresponding map distances and computes the distance differences; that is, the relative positional errors. The relative errors obtained from initial computations averaged about +/- 200 m. These errors could result from a number of sources, including misidentification of GCP locations, UTM coordinate errors introduced by the map digitizing process or errors resulting from data acquisition and geometric processing. M.G.

N84-13634*# California Univ., Berkeley. Space Sciences Lab.
ANALYSIS OF THE QUALITY OF IMAGE DATA ACQUIRED BY THE LANDSAT-4 THEMATIC MAPPER (TM) OF THE BLACK HILLS AREA, SOUTH DAKOTA Final Technical Report, 8 Sep. 1982 - 14 Sep. 1983
Robert N. Colwell, Principal Investigator 27 Oct. 1983 5 p refs ERTS
(NASA Order S-98091-B)
(E84-10041; NASA-CR-174593; NAS 1.26:174593) Avail: NTIS HC A02/MF A01 CSCL 05B

The structure, format, and quality of the LANDSAT-4 TM and MSS photographic and digital products for one scene covering the Black Hills area of South Dakota were assessed and the extent to which major resource categories can be detected and identified on various photographic products generated from a subset of TM spectral bands and from all bands of the MSS was determined. The overall spectral, spatial, and radiometric quality of the TM data was found to be excellent. Agricultural fields of variable shape, size, and orientation were detected with relative ease. The addition of the short-wave infrared band (TM5) has significantly improved the ability to detect and identify crop types on single date imagery. M.G.

N84-13635*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
A SIMULATION STUDY OF SCENE CONFUSION FACTORS IN SENSING SOIL MOISTURE FROM ORBITAL RADAR Final Report
Fawwaz T. Ulaby, Principal Investigator, M. C. Dobson, S. Moezzi, and F. T. Roth Aug. 1983 138 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Contract NCC9-6; Proj. AgRISTARS)
(E84-10042; NASA-CR-171715; SR-K3-04438; NAS 1.26:171715; RSL-601-1) Avail: NTIS HC A07/MF A01 CSCL 08M

Simulated C-band radar imagery for a 124-km by 108-km test site in eastern Kansas is used to classify soil moisture. Simulated radar resolutions are 100 m by 100 m, 1 km by 1km, and 3 km by 3 km. Distributions of actual near-surface soil moisture are established daily for a 23-day accounting period using a water budget model. Within the 23-day period, three orbital radar overpasses are simulated roughly corresponding to generally moist, wet, and dry soil moisture conditions. The radar simulations are performed by a target/sensor interaction model dependent upon a terrain model, land-use classificaton, and near-surface soil moisture distribution. The accuracy of soil-moisture classification is evaluated for each single-date radar observation and also for multi-date detection of relative soil moisture change. In general, the results for single-date moisture detection show that 70% to 90% of cropland can be correctly classified to within +/- 20% of the true percent of field capacity. For a given radar resolution, the expected classification accuracy is shown to be dependent upon both the general soil moisture condition and also the geographical distribution of land-use and topographic relief. An analysis of cropland, urban, pasture/rangeland, and woodland subregions within the test site indicates that multi-temporal detection of relative soil moisture change is least sensitive to classification error resulting from scene complexity and topographic effects. M.G.

N84-13636*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ANALYSIS OF MULTISPECTRAL SCANNER (MSS) AND THEMATIC MAPPER (TM) PERFORMANCE (PRE-LAUNCH AND POST-LAUNCH)
John L. Barker 1983 112 p Presented at the 5th Meeting of the LANDSAT Tech. Working Group (LTWG), 28-30 Sep. 1983 ERTS
(E84-10043; NASA-TM-85481; NAS 1.15:85481) Avail: NTIS HC A06/MF A01 CSCL 08B

Tables and graphs show the results of the spectral, radiometric, and geometric characterization of LANDSAT 4 sensors associated with imagery and of the imagery associated with sensors and processing. Specifications for the various parameters are compared with the photoflight and flight values. A.R.H.

N84-13637*# Arizona Univ., Tucson. Optical Sciences Center.
IN-FLIGHT ABSOLUTE RADIOMETRIC CALIBRATION OF THE THEMATIC MAPPER
K. R. Castle, R. G. Holm, C. J. Kastner, J. M. Palmer, P. N. Slater, M. Dinguirard (Centre d'Etudes et de Recherches de Toulouse), C. E. Ezra (Agricultural Research Service, Phoenix, Ariz.), R. D. Jackson (Agricultural Research Service, Phoenix, Ariz.), and R. Savage (Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.) [1983] 10 p refs ERTS
(Contracts NAS5-27382; DI-12-14-50001-38)
(E84-10044; NASA-CR-174611; NAS 1.26:174611) Avail: NTIS HC A02/MF A01 CSCL 08B

The TM multispectral scanner system was calibrated in an absolute manner before launch. To determine the temporal changes of the absolute radiometric calibration of the entire system, spectroradiometric measurements of the ground and the atmosphere were made simultaneously with TM collections over White Sands, New Mexico. By entering the measured values in an atmospheric radiative transfer program, the radiance levels of the in four of the spectral bands of the TM were determined. Tables show values for the reflectance of snow at White Sands measured by a modular 8 channel radiometer, and values for exoatmospheric irradiance within the TM passbands, calculated for the Earth-Sun distance using a solar radiometer. A.R.H.

N84-13638*# Arizona Univ., Tucson. Optical Sciences Center.
SPECTRORADIOMETRIC CALIBRATION OF THE THEMATIC MAPPER AND MULTISPECTRAL SCANNER SYSTEM Quarterly Report, 1 Aug. - 1 Nov. 1983
Philip N. Slater, Principal Investigator and James M. Palmer 1 Nov. 1983 16 p refs ERTS
(Contract NAS5-27382)
(E84-10045; NASA-CR-174612; NAS 1.26:174612; QR-4) Avail: NTIS HC A02/MF A01 CSCL 08B

The design of a spectroradiometer under construction for atmospheric and surface measurements at White Sands, New Mexico is described. The instrument's observation capability encompasses (1) measuring the solar radiance at a number of wavelengths as a function of air mass for Langley plot analysis in order to generate the optical depth; (2) measuring the ground radiance to determine the absolute ground reflectance; and

(3) measuring the sky radiance as a method of checking the accuracy of the radiative transfer program. A.R.H.

N84-13639*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
APPLICATION OF REMOTE SENSING TO HYDROLOGICAL PROBLEMS AND FLOODS [APLICACIONES DE LOS SENSORES REMOTOS A PROBLEMAS HIDROLOGICOS E INUNDACIONES]
Nelson de Jesus Parada, Principal Investigator and Evlyn M. L. M. Novo Oct. 1983 18 p refs In PORTUGUESE; ENGLISH summary Presented at Aplicaciones de Los Sensores Remotos en Hidrometeorol. y en Preparacion para Afrontar Desastres Rurales, Bogota, 13-24 Jun. 1983 Sponsored by NASA Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E84-10046; NASA-CR-174513; NAS 1.26:174513; INPE-2896-PRE/415) Avail: NTIS HC A02/MF A01 CSCL 08H

The main applications of remote sensors to hydrology are identified as well as the principal spectral bands and their advantages and disadvantages. Some examples of LANDSAT data applications to flooding-risk evaluation are cited. Because hydrology studies the amount of moisture and water involved in each phase of hydrological cycle, remote sensing must be emphasized as a technique for hydrological data acquisition. A.R.H.

N84-13640*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RISE IN THE FREQUENCY OF CLOUD COVER IN LANDSAT DATA FOR THE PERIOD 1973 TO 1981 [LEVANTAMENTO DA FREQUENCIA DE COBERTURA DE NUVENS EM DADOS DO LANDSAT NO PERIODO DE 1973 A 1981]
Nelson de Jesus Parada, Principal Investigator, Francisco Jose Mendonca, and Gilberto Camara Neto Sep. 1983 75 p In PORTUGUESE; ENGLISH summary Sponsored by NASA ERTS
(E84-10047; NASA-CR-174614; NAS 1.26:174614; INPE-2882-RPE/443) Avail: NTIS HC A04/MF A01 CSCL 04B

Percentages of cloud cover in LANDSAT imagery were used to calculate the cloud cover monthly average statistic for each LANDSAT scene in Brazil, during the period of 1973 to 1981. The average monthly cloud cover and the monthly minimum cloud cover were also calculated for the regions of north, northeast, central west, southeast and south, separately. Author

N84-13641*# Michigan State Univ., East Lansing. Center for Remote Sensing.
PHOTO INTERPRETATION KEY TO MICHIGAN LAND COVER/USE
William R. Enslin, William D. Hudson, and David P. Lusch Apr. 1983 65 p ERTS
(Grant NGL-23-004-083)
(E84-10048; NASA-CR-174615; NAS 1.26:174615) Avail: NTIS HC A04/MF A01 CSCL 14E

A set of photo interpretation keys is presented to provide a structured approach to the identification of land cover/use categories as specified in the Michigan Resource Inventory Act. The designated categories are urban and; built up lands; agricultural lands; forest land; nonforested land; water bodies; wetlands; and barren land. The keys were developed for use with medium scale (1:20,000 to 1:24,000) color infrared aerial photography. Although each key is generalized in that it relies only upon the most distinguishing photo characteristics in separating the various land cover/use categories, additional interpretation characteristics, distinguishing features and background material are given. A.R.H.

N84-13642*# Pan American Univ., Edinburg, Tex.
SEASONAL SOYBEAN CROP REFLECTANCE Final Technical Report
E. W. LeMaster, Principal Investigator and J. E. Chance [1983] 90 p refs ERTS
(Grant NsG-9033)
(E84-10049; NASA-CR-174617; NAS 1.26:174617) Avail: NTIS HC A05/MF A01 CSCL 05B

Data are presented from field measurements of 1980 including 5 acquisitions of handheld radiometer reflectance measurements, 7 complete sets of parameters for implementing the Suits mode, and other biophysical parameters to characterize the soybean canopy. LANDSAT calculations on the simulated Brazilian soybean reflectance are included along with data collected during the summer and fall on 1981 on soybean single leaf optical parameters for three irrigation treatments. Tests of the Suits vegetative canopy reflectance model for the full hemisphere of observer directions as well as the nadir direction show moderate agreement for the visible channels of the MSS and poor agreement in the near infrared channel. Temporal changes in the spectral characteristics of the single leaves were seen to occur as a function of maturity which demontrates that the absorptance of a soybean single leaf is more a function of the transmittance characteristics than the seasonally consistent single leaf reflectance. A.R.H.

N84-13643*# Geological Survey, Reston, Va.
EVALUATION OF RADIOMETRIC AND GEOMETRIC CHARACTERISTICS OF LANDSAT-D IMAGING SYSTEM Quarterly Report
J. Salisbury, M. Podwysocki, Lee U. Bender, and L. Rowan, Principal Investigators Nov. 1983 4 p ERTS
(NASA Order S-12407-C)
(E84-10050; NASA-CR-174616; NAS 1.26:174616; QR-2) Avail: NTIS HC A02/MF A01 CSCL 05B

With vegetation masked and noise sources eliminated or minimized, different carbonate facies could be discriminated in a south Florida scene. Laboratory spectra of grab samples indicate that a 20% change in depth of the carbonate absorption band was detected despite the effects of atmospheric absorption. Both bright and dark hydrothermally altered volcanic rocks can be discrimated from their unaltered equivalents. A previously unrecognized altered area was identified on the basis of the TM images. The ability to map desert varnish in semi-arid terrains has economic significance as it defines areas that are less susceptible desert erosional process and suitable for construction development. A.R.H.

N84-13644# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C.
AUTOMATED STANDARD NAUTICAL CHART PRODUCTION Final Report
Larry Strewig, Joseph P. Ruys, and Jan S. Schneier 15 Jul. 1983 11 p Presented at the 6th Intern. Symp. on Automated Cartography, Ottawa, 16-21 Oct. 1983
(AD-A132249) Avail: NTIS HC A02/MF A01 CSCL 08/2

In September of 1982, the Defense Mapping Agency Hydrographic/Topographic Center printed and released to the public a Standard Nautical Chart which was compiled, symbolized, and color separated using computer technology. The production of this chart involved several different computer driven mapping systems, as well as a unique mix of cartographers and computer specialists. This report describes the methodology, techniques, and computer systems used to produce the chart. Author (GRA)

N84-13645# Naval Research Lab., Washington, D. C.
REAL-TIME PROCESSING SYSTEM FOR THE NRL (NAVAL RESEARCH LABORATORY) REMOTE SENSING EXPERIMENT: PHELPS BANK, JULY 1982
R. A. Munch and J. A. C. Kaiser 2 Sep. 1983 44 p
(AD-A132151; AD-E850405; NRL-MR-5175) Avail: NTIS HC A03/MF A01 CSCL 08/10

A data acquisition and analysis system was implemented to collect multichannel time series data at a slow rate (.5 Hz for this implementation) for extended periods (days), quality check the data, and provide real-time output of environmental parameters and data quality assessments. During acquisition and processing, constants, data channels and processing algorithms can be altered by the operator in real time without interrupting data flow and processing. This report describes this system, contains a users guide to the system and gives examples of the outputs. GRA

N84-13646# Naval Research Lab., Washington, D. C.
DATA VALIDATION AND SUMMARY FOR THE NRL REMOTE SENSING EXPERIMENT: PHELPS BANK, JULY, 1982. PART 2: METEOROLOGY Interim Report
J. A. C. Kaiser and R. A. Munch 26 Aug. 1983 100 p
(RR01310441)
(AD-A132105; AD-E800784; NRL-MR-5160) Avail: NTIS HC A05/MF A01 CSCL 04/2

During the NRL Remote Sensing Experiment in the Phelps Bank region meteorological data were obtained by the USNS HAYES. The data is validated, summarized and plotted. Relevant atmospheric parameters describing stability and sea-air fluxes are also summarized and plotted. GRA

N84-13647# Bendix Field Engineering Corp., Grand Junction, Colo.
ASSESSMENT OF QUALITY OF DATA ON TAPES FROM THE HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE
Donna Brock and Walter R. Averett Sep. 1983 27 p
(Contract DE-AC13-76GJ-01664)
(DE83-017697; GJBX-36(83)) Avail: NTIS HC A03/MF A01

This report contains the results of limited assessment of the quality of data on tapes that were generated by Los Alamos National Laboratory, Oak Ridge Gaseous Diffusion Plant, Lawrence Livermore National Laboratory, and Savannah River Laboratory as part of their participation in the Hydrogeochemical and Stream Sediment Reconnaissance (HSSR), one of the elements of the National Uranium Resource Evaluation. The assessment was limited to verification of file content and detailed examination of each file in search of deviations from stated formats, missing data, missing or incorrect coordinates for sample sites, duplication of data, coding errors, unreadable data, data out of range of valid parameters, and other apparent problems that may contribute to difficulty in reading and understanding the data. The purpose of this report is to assist users of HSSR data tapes who have specific problems with particular tapes or who want to know if they are likely to have problems. More than 500 tapes were evaluated. About half of them had discrepancies of some sort, ranging from probably trivial to probably very significant, but rarely were the accumulation and nature of discrepancies enough to suggest that the usefulness of some segment of the data might be in question. DOE

N84-13648# Oak Ridge National Lab., Tenn. Environmental Sciences Div.
SOLUTION OF GROUNDWATER-FLOW EQUATIONS USING AN ORTHOGONAL FINITE-ELEMENT SCHEME
Gour-Tsyh Yeh 1983 43 p refs Presented at the Association for the Advancement of Modelling and Simulation Techniques in Enterprises Summer Conf., Nice, 12 Sep. 1983
(Contract W-7405-eng-26)
(DE84-000690; CONF-8309160-1) Avail: NTIS HC A03/MF A01

A new finite element scheme for approximating the groundwater flow equation, that will result in a matrix with properties of the positive type and diagonal dominance is presented. The matrix equation is amenable to the pointwise iteration solution strategies. This scheme differs from the standard Galerkin scheme in that discretization is performed using a general weighted residual procedure and weighting functions orthogonal to basis functions. Numerical results were obtained for two verification examples and are compared with results using the conventional Galerkin scheme and with analytical solutions. It is shown that both the direct elimination and pointwise iteration solutions of the new orthogonal finite element equation yield as accurate results as those obtained by the direct elimination solution of the Galerkin finite element scheme. While the pointwise iteration solution of the Galerkin finite element method converges for one example, it generated divergent solutions for the other. Steady-state flow in a homogeneous medium is used to compare the utility and versatility of the new scheme with the conventional Galerkin finite element method. DOE

N84-13649# Nevada Univ., Reno. Water Resources Center.
DEVELOPMENT OF DESIGN HYETOGRAPHS FOR SOUTHERN NEVADA
Richard H. French Jun. 1983 48 p refs
(Contract DE-AC08-81NV-10162)
(DE84-001227; DOE/NV-10162/11) Avail: NTIS HC A03/MF A01

Traditionally, drainage facilities are designed from an estimate of the peak flood discharge of a specified return period which is expected to occur in a channel. In small watersheds, particularly those located in the semi-arid and sparsely populated Southwest, measured flood discharge data are often unavailable, not dependable, or the period of record is very short. In many areas of the Southwest, there are often relatively long and accurate records of precipitation in areas where there are few flow records. The use of a design hyetograph and a simple watershed model which may provide information regarding the peak discharge for the design of drainage facilities are discussed. The historical precipitation records at Well 5B and Cane Spring on the Nevada Test Site and at McCarran International Airport in Las Vegas, Nevada from the viewpoint of developing a generalized, triangular design hyetograph hypothesis for the Southern Nevada area were evaluated. DOE

N84-13650# Edgerton, Germeshausen and Grier, Inc., Las Vegas, Nev. Energy Measurements Group.
AERIAL RADIOLOGICAL SURVEY OF AREA 11, NEVADA TEST SITE
Jun. 1983 22 p refs
(Contract DE-AC08-83NV-10282)
(DE84-000440; EGG-10282-1004) Avail: NTIS HC A02/MF A01

Area 11's Plutonium Valley was surveyed by aerial radioles. Contour maps representing terrestrial exposure rates and soil concentrations of transuranics, (235)U and (137)Cs are presented on an aerial photograph. Inventories of the locale's transuranic and uranium activities are included. DOE

N84-13651# Battelle Columbus Labs., Ohio.
THE ORGANIC GEOCHEMISTRY OF DEEP GROUND WATERS AND RADIONUCLIDE-PARTITIONING EXPERIMENT: UNDER HYDROTHERMAL CONDITIONS
Jeffrey L. Means, Ann S. Maest, and David A. Crear Jul. 1983 87 p refs
(Contracts DE-AC06-76RL-01830; DE-AC02-83CH-10140)
(DE83-015784; ONWI-448) Avail: NTIS HC A05/MF A01

The organic geochemistry of groundwater samples from the Permiam Basin of Texas, the Paradox Basin of Utah, and the Nevada Test Site were characterized. Acidic compounds were derivatized and analyzed using gas chromatography mass spectrometry, and the molecular weight characteristics of the organic constituents present were determined by dialysis and gel filtration chromatography. Although the specific organic composition varies from aquifer to aquifer, the organic components of these groundwaters appear to be composed principally of low molecular weight polar compounds derived from local hydrocarbon deposits. The principal organic species appear to be humic compounds and low molecular weight fatty acids. The adsorption of certain radionuclides by geologic substrates was measured in the presence and absence of organic complexing agents from 25 to 2500 C. Major findings include: (1) in some cases the extent of adsorption of Sr, Co, and U actually increases with increasing temperature; (2) oxalic acid either has little effect on the adsorption or actually increases the adsorption of Cs and Sr by kaolinite, illite, and montmorillonite; (3) the thermal degradation of natural organic compounds in the near field environment may be signification; and (4) the adsorption of U, Co, and Sr, and Cs onto kaolinite and montmorillonite reaches a steady state in less than an hour at 250 C, 1 atm. DOE

N84-13652# Marine Biological Lab., Woods Hole, Mass. Ecosystems Center.
DEFORESTATION MEASURED BY LANDSAT: STEPS TOWARD A METHOD
G. M. Woodwell, J. E. Hobbie, R. A. Houghton, J. M. Melillo, B. J.

Peterson, G. R. Shaver, T. A. Stone, B. Moore (New Hampshire Univ., Durham), and A. B. Park (General Electric Co., Lanham, MD.) Jun. 1983 66 p refs
(Contract DE-AC02-80EV-10468)
(DE83-016645; DOE/EV-10468/1) Avail: NTIS HC A04/MF A01

The magnitude of the annual carbon flux due to deforestation is a function of the rate of deforestation and biotic factors including biomass, soil organic matter, and the fraction of the stock of organic matter oxidized following disturbance. Immediate improvement in estimation of the carbon flux to the atmosphere depends on reducing the uncertainty in estimates of rates of deforestation. Three approaches to the use of LANDSAT data seemed possible. First, if a sufficiently detailed classification of vegetation can be made from a single LANDSAT image, an estimate of net flux is possible through use of a model. This is the single image approach. Second, LANDSAT imagery might be used to construct two classification inventories of the amount of carbon in the vegetation at different dates. Finally, the technique of change detection using satellite imagery might be applied by substracting the digital information in a later image from a former image to produce a third data set that records only the changes. DOE

N84-13653# Pacific Northwest Lab., Richland, Wash.
TRANSPORT ASSESSMENT: ARID TASK. MODEL VERIFICATION STUDIES Annual Report
T. L. Jones, R. R. Kirkham, and D. Gibson Aug. 1983 15 p Presented at the 5th Ann. Participants Inform. Meeting of DOE Low Level Waste Management Program, Denver, 30 Aug. 1983
(Contract DE-AC06-76RL-01830)
(DE84-000121; PNL-SA-11537; CONF-8308106-7) Avail: NTIS HC A02/MF A01

The current focus of the Transport Assessment - Arid Task is the evaluation of evaporation and transpiration submodels used in water flow models. Models will be evaluated by how accurately they simulate field water balance data. To date we have: (1) selected four evaporation models to be tested, (2) constructed an evaporation test case, and (3) started collection of data for a transpiration test case. Evaluation of the evaporation models will be completed during FY83, with results published in September. The evaporation test case contains data describing soil water content, water storage, as well as drainage rates observed in the unvegetated lysimeters of the BWTF. For example, data show deep drainage accounted for 8% of the natural precipitation, but rose to 25% after irrigation doubled total precipitation. This year, deep drainage was also observed in vegetated soils. These results refute a commonly held assumption that evapotranspiration eliminates deep drainage in arid soils. DOE

N84-13654# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Structures Lab.
PETROGRAPHIC EXAMINATION OF BELL CANYON TESTS (BCT) 1-FF FIELD GROUTS OVER A 3-YEAR PERIOD Interim Report
Jerry P. Burkes and Jay E. Rhoderick Aug. 1983 40 p refs
(Contract DE-FG97-80ET-46630)
(DE83-018226; DOE/NBM-3018226; MP-SL-83-12) Avail: NTIS HC A03/MF A01

The Bell Canyon field test involving the placement of two grout plugs took place 26 September 1979 (plug 1) and 14 February 1980 (plug 2). Samples cast in the field were brought to WES and cured in hole AFC-7 (lease) brine. Samples were examine periodically through 1 year and then at 2-and 3-years age to obtain petrographic, physical, and some chemical data. This report deals solely with the petrographic data. Cracking was believed to be due largely to moisture and temperature changes in the laboratory. The two plugs were similar in composition with the Plug 1 grout have more tetracalcium aluminate monosulfate-12-hydrate and more garnet-hydrogarnet solid solution series material (hydrogarnet) by X-ray diffraction (XRD) than Plug 2. Tetracalcium aluminate dichloride-10-hydrate was present in both samples in varying amounts at different ages. Plug 2 grout contained more ettringite and calcium hydroxide; Plug 1 grout contained more detectable calcium silicate hydrate. The grout to host anhydrite rock bond appeared to be tight with no visible cracking in simulated borehole samples that were examined immediately after fracturing. DOE

N84-13655# Sandia Labs., Albuquerque, N. Mex.
SEISMIC INVESTIGATION OF THE MULTI-WELL EXPERIMENT SITE
Craig A. Searls 1983 11 p refs Presented at the Western Gas Sands Sub-program Rev. Meeting, Morgantown, W. Va., 18 Oct. 1983
(Contract DE-AC04-76DP-00789)
(DE84-000943; SAND-83-2135C; CONF-8310162-7) Avail: NTIS HC A02/MF A01

A series of seismic studies were performed at the Department of Energy Multi-Well Experiment site to delineate the character of the bedding within the Mesaverde group in western Colorado. The experiments consisted of a three dimensional seismic survey of the area, a vertical seismic profile of two wells at the site and a cross borehole survey covering zones of special interest. Analysis of this data both as single experiments, and used in combination, is being used to determine the extent to which the geology may be inferred from seismic records. DOE

N84-13656# Bureau of Mines, Pittsburgh, Pa.
CORRELATION OF LANDSAT AND AIR PHOTO LINEARS WITH ROOF CONTROL PROBLEMS AND GEOLOGIC FEATURES Report of Investigations
Jacqueline H. Jansky and Ronald F. Valane Jul. 1983 28 p refs
(PB83-250852; BM-RI-8777) Avail: NTIS HC A03/MF A01 CSCL 08I

A linear analysis for a new underground coal mine in Grant County, WV was conducted through the interpretation of LANDSAT imagery and high-altitude, color-infrared aerial photography, to identify areas of potentially unstable roof in advance of mining. The Bureau of Mines included this mine in its ongoing study of the correlation between geologic features and linears. Three years after the analysis, after mining had progressed through the plotted linears, the effectiveness of the linear plot in predicting areas of unstable roof was evaluated and the geology associated with the linears was defined. GRA

N84-13657# National Bureau of Standards, Washington, D.C.
PROCEEDINGS OF THE 3RD LAN-TRANSPORT WORKSHOP. REPORT OF THE THIRD WORKSHOP FOR LOCAL AREA NETWORK IMPLEMENTORS OF THE NBS SPECIFICATIONS OF THE INTERNATIONAL STANDARDS ORGANIZATION TRANSPORT CLASS 4 PROTOCOL: SPECIAL INTEREST GROUP ON FILE TRANSFER PROTOCOL
Jul. 1983 267 p Workshop held 18-20 Jul. 1983
(PB83-251348; NBSIR-83-2757) Avail: NTIS HC A02/MF A01 CSCL 13B

The previous Water Resources Research Center bibliographies (Technical Report Nos. 50 and 88) were evaluated by the project staff, assisted by an advisory committee to determine how this bibliography could be improved. As a result of the discussion and evaluation, the order and presentation of the entries in the Annotated Listing were revised. Although the original research approach was to include publications issued between 1971 through 1978, earlier as well as more recent publications have been included. Secondary sources of information that were also used in compiling information included the Engineering Index, Selected Water Resources Abstracts, and the Water Resources Scientific Information Center. Author (GRA)

N84-13658# Nevada Univ. System, Reno. Water Resources Center.
PARAMETRIC MODEL FOR PEAK FLOW PREDICTION IN UNGAGED EPHEMERAL WATERSHEDS
A. D. Truschel and M. E. Campana Jul. 1983 121 p refs
(Contract DI-14-34-0001-0232)
(PB83-249698; PUB-41083; W83-03778; OWRT-B-122-NEV(1)) Avail: NTIS HC A06/MF A01 CSCL 08H

The prediction of peak flows from ungaged ephemeral watersheds is an important aspect of arid zone engineering hydrology. Sophisticate physically based models are currently available for the estimation of peak flows; however, these models can be difficult to use and generally require detailed information on watershed properties. Parametric runoff models, while lacking complexity, require large amounts of historical rainfall-runoff data for calibration, data that are unavailable in ungaged watersheds. To overcome these difficulties, a physically based model of an ephemeral watershed was used to generate synthetic calibration data. The calibration method was validated by applying it to 53 storm runoff events from ephemeral watersheds in Oklahoma, Texas and Arizona. Author (GRA)

N84-13659# Geological Survey, Albany, N.Y.
MICROSEISMIC MONITORING FOR EVIDENCE OF GEOTHERMAL HEAT IN THE CAPITAL DISTRICT OF NEW YORK Final Report
Walter Mitronovas Jun. 1983 62 p refs Sponsored in part by DOE
(PB83-248807; NYSERDA-83-6) Avail: NTIS HC A04/MF A01 CSCL 08K

Seismic monitoring work was carried out to determine more exactly the relationship between seismicity and postulated geothermal and related activity in the Albany-Saratoga Springs area. The seismic monitoring consisted of setting up and operating within and around the study area, a network of six to seven seismograph stations capable of detecting and locating small earthquakes. In addition, a list of all known historical and early instrumental earthquakes was compiled and improved from original sources for the study area. Additional field work was done to determine seismic velocities of P and S phases by special recording of quarry blasts. Author (GRA)

N84-13660# Ecological Analysts, Inc., Sparks, Md.
SURVEY OF WATER QUALITY AND FLOW IN MARYLAND COASTAL ZONE STREAMS: A DATA REPORT Final Report
May 1983 32 p
(PB83-249375; PPSP-MP-50) Avail: NTIS HC A03/MF A01 CSCL 08H

Water quality data were collected weekly during March and April 1983 for 23 freshwater tributaries to the Chesapeake Bay as a pilot study in an assessment of the significance of acid deposition in Maryland. Parameters measured included pH, dissolved oxygen, specific conductance, alkalinity, dissolved aluminum, nitrate, sulfate, and stream flow. This report presents the data from that effort, without analysis or interpretation. Author (GRA)

N84-13661# National Oceanic and Atmospheric Administration, Seattle, Wash.
A SATELLITE STUDY OF OCEAN INTERNAL WAVES
Constance Sawyer Mar. 1983 75 p refs
(PB83-248706; NOAA-TM-ERL-PMEL-48; CONTRIB-634; NOAA-83081106) Avail: NTIS HC A04/MF A01 CSCL 08C

Ocean internal-wave slicks over the eastern U.S. continental shelf imaged by the satellite LANDSAT are described and analyzed. This study confirms generation by semidiurnal tides, locates the site of generation at the edge of the continental shelf, and establishes the time of generation near the time of maximum flood current. Characteristics such as wavepacket extent, water depth, and packet lifetime are quantitatively described. The wavelength spectrum derived from spacing of slicks observed near generation is far from a smooth 'universal spectrum.' Slick visibility is discussed in terms of modification of surface-wave amplitude by the near-surface current system of the internal waves. From uniformly spaced series of packets, and from similar packet images recorded on successive days, the median lifetime of slick packets is found to be two to three tidal cycle. Author (GRA)

N84-13662# Forest Service, New Orleans, La. Southern Forest Experiment Station.
FOREST STATISTICS FOR SOUTHWEST-NORTH ALABAMA COUNTIES
Feb. 1983 17 p
(PB83-251314; FSRB/SO-92) Avail: NTIS HC A02/MF A01 CSCL 02F

The report tabulates forest resource information from a new inventory of the Southwest-North Unit of Alabama. Author (GRA)

N84-13663# Forest Service, Asheville, N.C.
THE HARDWOOD RESOURCE ON NONINDUSTRIAL PRIVATE FOREST LAND IN THE SOUTHEAST PIEDMONT
William A. Bechtold and Douglas R. Phillips 31 Aug. 1983 23 p refs
(PB83-252759; FSRP-23-236) Avail: NTIS HC A02/MF A01 CSCL 02F

More than half of the commercial forest land in the Southeast Piedmont supports hardwood stands held by small nonindustrial private landowners. Only 21 percent of all Nonindustrial Private Forest (NIPF) stands are fully stocked with growing-stock trees. Only 37 percent of all hardwood biomass harvested from these stands is currently being utilized. As these stands are harvested, about 39 tons of living residues per acre are left standing. GRA

N84-13664# Forest Service, New Orleans, La. Forest Inventory and Analysis Research Work Unit.
FOREST STATISTICS FOR SOUTHWEST-SOUTH ALABAMA COUNTIES, FOREST SERVICE RESOURCE BULLETIN
Feb. 1983 19 p
(PB83-249763; FSRB/SO-91) Avail: NTIS HC A02/MF A01 CSCL 02F

The report tabulates resource information from a new inventory of the southwest-south Unit of Alabama. GRA

N84-13665# Forest Service, New Orleans, La.
THE FOREST RESOURCES OF PUERTO RICO, FOREST SERVICE RESOURCE BULLETIN
Richard A. Birdsey and Peter L. Weaver Oct. 1982 65 p refs
(PB83-249995; FSRB/SO-85) Avail: NTIS HC A04/MF A01 CSCL 02F

The report is a forest survey conducted in 1980 which found 130 thousand hectares of potential commercial timberland and 1148 thousand hectares of other forest land in Puerto Rico. GRA

N84-13666# Forest Service, New Orleans, La. Forest Inventory and Analysis Research Work Unit.
FOREST STATISTICS FOR SOUTHEAST ALABAMA COUNTIES, FOREST SERVICE RESOURCE BULLETIN
Feb. 1983 21 p
(PB83-250753; FSRB/SO-94) Avail: NTIS HC A02/MF A01 CSCL 02F

The report tabulates forest resource information from a new inventory of the Southeast Unit of Alabama. GRA

N84-13667# Forest Service, Ogden, Utah.
FOREST AREA AND TIMBER RESOURCE STATISTCS FOR STATE AND PRIVATE LANDS IN NEW MEXICO, 1980, FOREST SERVICE RESOURCE BULLETIN
Dorothy G. Felt and Velma J. Sterrett Aug. 1983 34 p
(PB83-251157; FSRB/INT-32) Avail: NTIS HC A03/MF A01 CSCL 02F

The report presents land area, commercial timberland area, timber inventory, and growth and mortality data based on Forest Survey standards, for state and private lands in New Mexico. GRA

N84-13668# Forest Service, New Orleans, La. Forest Inventory and Analysis Research Work Unit.
FOREST STATISTICS FOR WEST CENTRAL ALABAMA COUNTIES, FOREST SERVICE RESOURCE BULLETIN
Feb. 1983 18 p
(PB83-249961; FSRB/SO-93) Avail: NTIS HC A02/MF A01 CSCL 02F

The report tabulates forest resource information from a new inventory of the West Central Unit of Alabama. GRA

N84-13669# Intermountain Forest and Range Experiment Station, Ogden, Utah.

EVALUATING PROPOSED IMPROVEMENTS OF PUBLIC RANGELANDS
Fred J. Wagstaff Jul. 1983 8 p refs
(PB83-251124; FSGTR/INT-150) Avail: NTIS HC A02/MF A01 CSCL 02B

Basic economic concepts and analysis processes relevant to analysis of proposed range improvements projects are presented in the report. These matters are of concern because increasing pressure for more consideration of the economics of public programs are being felt by land managers and administration.
GRA

N84-13416*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RESULTS OF THE AUSTRALIAN GEODETIC VLBI EXPERIMENT
B. R. Harvey (New South Wales Univ., Kensington, Australia), A. Stolz (New South Wales, Kensington, Australia), D. L. Jauncey (CSIRO, Epping, Australia), A. Niell, D. Morabito, and R. Preston *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 140-146 refs (For primary document see N84-13401 04-32) Avail: NTIS HC A08/MF A01 CSCL 08B

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N84-13670*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MOD-2 WIND TURBINE DEVELOPMENT
Larry H. Gordon, John S. Andrews (Boeing Engineering and Construction Co., Tukwila, Wash.), and Donald K. Zimmerman (Boeing Engineering and Construction Co., Tukwila, Wash.) [1983] 28 p refs Presented at the 6th Wind Workshop, Minneapolis, 1-3 Jun. 1983
(Contract DE-AI01-79ET-20305)
(NASA-TM-83460; E-1776; NAS 1.15:83460;
DOE/NASA-20305-9) Avail: NTIS HC A03/MF A01 CSCL 10A

The development of the Mod-2 turbine, designed to achieve a cost of electricity for the 100th production unit that will be competitive with conventional electric power generation is discussed. The Mod-2 wind turbine system (WTS) background, project flow, and a chronology of events and problem areas leading to Mod-2 acceptance are addressed. The role of the participating utility during site preparation, turbine erection and testing, remote operation, and routine operation and maintenance activity is reviewed. The technical areas discussed pertain to system performance, loads, and controls. Research and technical development of multimegawatt turbines is summarized. Author

N84-13671*# Boeing Aerospace Co., Seattle, Wash.
ANALYSIS OF REGENERATIVE FUEL CELLS Final Report
Sidney Gross Nov. 1982 148 p refs
(Contract NAS9-16151)
(NASA-CR-171783; NAS 1.26:171783; D180-27160-1) Avail: NTIS HC A07/MF A01 CSCL 10A

The concept of a rechargeable fuel cell (RFC) system is considered. A newer type of rechargeable battery, the nickel hydrogen (Ni-H2) battery, is also evaluated. A review was made of past studies which showed large variations in weight, cost, and efficiency. Hydrogen-bromine and hydrogen-chlorine regenerable fuel cells were studied, and were found to have a potential for higher energy storage efficiency then the hydrogen-oxygen system. A reduction of up to 15 percent in solar array size may be possible as a result. These systems are not yet developed, but further study of them is recommended. Author

N84-13672*# Engelhard Corp., Menlo Park, Calif. Industries Div.
DEVELOP AND TEST FUEL CELL POWERED ON-SITE INTEGRATED TOTAL ENERGY SYSTEMS. PHASE 3: FULL-SCALE POWER PLANT DEVELOPMENT Quarterly Report, May - Jul. 1983
H. Feigenbaum, A. Kaufman, C. L. Wang, J. Werth, and J. A. Whelan 31 Oct. 1983 25 p refs
(Contracts DEN3-241; DE-AI01-80ET-17088)
(NASA-CR-168294; DOE/NASA-0241/10; NAS 1.26:168294;
QR-10) Avail: NTIS HC A02/MF A01 CSCL 10A

Operating experience with a 5kW methanol-air integrated system is described. On-going test results for a 24-cell, two-sq ft (4kW) stack are reported. The main activity for this stack is currently the evaluation of developmental non-metalic cooling plates. Single-cell test results are presented for a promising developmental cathode catalyst. Author

N84-13673*# Engelhard Industries, Inc., Edison, N.J.
DEVELOP AND TEST FUEL CELL POWERED ON-SITE INTEGRATED TOTAL ENERGY SYSTEM Quarterly Report, Feb. - Apr. 1983
A. Kaufman, H. Feigenbaum, C. L. Wang, J. Werth, and J. A. Whelan 5 Jul. 1983 42 p refs
(Contracts DEN3-241; DE-AI01-80ET-17088)
(NASA-CR-168239; DOE/NASA-0241/5; NAS 1.26:168239; QR-9)
Avail: NTIS HC A03/MF A01 CSCL 10A

Test results are presented for a 24 cell, two sq ft (4kW) stack. This stack is a precursor to a 25kW stack that is a key milestone. Results are discussed in terms of cell performance, electrolyte management, thermal management, and reactant gas manifolding. The results obtained in preliminary testing of a 50kW methanol processing subsystem are discussed. Subcontracting activities involving application analysis for fuel cell on site integrated energy systems are updated. S.C.L.

N84-13674*# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
NATURAL HAZARDS PHOTOGRAPH CATALOG, KEY TO GEOPHYSICAL RECORDS DOCUMENTATION NO. 20 Final Report
Patricia A. Lockridge Jun. 1983 148 p refs
(PB83-250415; NOAA-83081102) Avail: NTIS HC A08/MF A01 CSCL 08G

The National Geophysical Data Center (NGDC) and World Data Center A for Solid Earth Geophysics have collected from many private and governmental sources more than 2,000 photographs of effects from natural hazards that have occurred throughout the world, including earthquakes, tsunamis, and volcanoes. The collection contains photographs of events that span two centuries (1811-1981) and cover more than 37 countries. The publication gives a brief description (or caption) for each photograph in the collection and contains several examples of dramatic or unusual effects. The photograph captions are listed chronologically by date of occurrence of each event (except for volcano captions, which are listed by region) and are grouped into three categories: (1) earthquake damage; (2) tsunami waves and damage; and (3) volcanoes and volcanic features. GRA

N84-13675# BDM Corp., Albuquerque, N. Mex.
DESIGN ANALYSIS OF ADVANCED PHOTOVOLTAIC TECHNOLOGIES
T. J. Lambarski, C. A. Irby, G. J. Collaros, E. R. Anderson, P. Sowa, W. E. Schwinkendorf, and W. M. Resnik Aug. 1983 580 p refs Prepared for Midwest Research Inst., Golden, Colo.
(Contracts EC-77-C-01-4042; DE-AC02-77CH-00178)
(DE84-000008; SERI/STR-214-1997) Avail: NTIS HC A25/MF A01

Design and optimization methodologies for advanced photovol-

taic cells and devices as related to module and system application designs were addressed. Four advanced photovoltaic material cells polycrystalline silicon, amorphous silicon, CdS/CuInSe2, and gallium arsenide were evaluated for residential and central station system design applications. A module optimization methodology is described along with the computer code Photovoltaic Module Optimization Code (PVMOC), to assist PV module designers using advanced PV material cells in evaluating the performance and cost of alternative designs. DOE

N84-13676# Midwest Research Inst., Golden, Colo. Materials Research Branch.
MATRIX APPROACH TO TESTING MIRRORS, PART 2
Keith D. Masterson, A. W. Czanderna, J. Blea, R. Goggin, M. Gutierrez, G. Jorgensen, and J. McFadden Jul. 1983 106 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-011996; SERI/TR-255-1627) Avail: NTIS HC A06/MF A01

This report describes the experimental work and results from the second phase of the Matrix Approach to Testing Mirrors (MATM). Mirror specimens are subjected to heat, water vapor, pollutants, ultraviolet light, and mechanical stress for up to eight weeks. Analysis concluded that the degradation rates are very sensitive to temperature; above 950 to 1000 C, agglomeration causes the silver film to degrade rapidly; degradation is more severe in high humidity pollutants did not substantially alter the degradation rates; ultraviolet light did not significantly alter the degradation of solar reflectance; no synergistic effects were observed; specular and hemispherical reflectance techniques detect and quantify the early stages of degradation; and darkfield microphotography is a good technique for studying mirror degradation. DOE

N84-13677# Bates (Albert), Summertown, Tenn.
COLLAPSIBLE PHOTOVOLTAIC-CONCENTRATOR ARRAY PORTABLE POWER FROM THE SUN Final Project Report
Albert Bates 1 Mar. 1983 18 p
(Grant DE-FG44-81R-410435)
(DE84-000713; DOE/R4/10435/T1) Avail: NTIS HC A02/MF A01

A lightweight, inexpensive public address system was designed, constructed, and then demonstrated at the 1982 World's Fair. The system was powered by a portable, modular, concentrating photovoltaic array. After completion of the demonstration, experiments were conducted to examine alternative designs. All designs achieved the project goals of portability, weatherability, reduced expense, and adequate power margin. The prototypes are now used regularly at public gatherings in the Southeast. DOE

N84-13678# Martin Marietta Aerospace, Denver, Colo.
CELL-SUBSTRATE BONDING SYSTEM DESIGN AND DEVELOPMENT
L. S. Marshall Aug. 1983 99 p refs
(Contract DE-AC04-76DP-00789)
(DE84-000963; SAND-83-7021) Avail: NTIS HC A05/MF A01

Requirements for the design and development of a photovoltaic cell substrate bonding system are presented. Bonding materials were tested for thermal conductivity, thermal cycling degradation, intrinsic bond thickness, degradation over life, and shear and tensile strengths. Two designs each for point and line focus receivers were fabricated using different substrate materials and bonding methods and tested for material compatibility and stability, manufacturability, electrical and thermal performance, and potential for cost reduction. It is found that the copper clad invar design offers a slight cost advantage over the alumina/RTV system. DOE

N84-13679# Thermo Electron Corp., Waltham, Mass.
DESIGN AND DEVELOPMENT OF A HIGH-CONCENTRATION AND HIGH-EFFIECIENCY PHOTOVOLTAIC CONCENTRATOR USING A CURVED FRESNEL LENS
R. S. Scharlack and A. Moffat Aug. 1983 157 p refs
(Contract DE-AC04-76DP-00789)
(DE84-000967; SAND-83-7024) Avail: NTIS HC A08/MF A01

A high concentration photovoltaic module that uses a domed, point focus Fresnel lens was designed. The design, design optimization process, and results from lens and receiver tests are described. Optical design, analysis, and testing of both secondary optical units and domed Fresnel lenses made a significant contribution to the project. DOE

N84-13680# California Univ., Berkeley. Lawrence Berkeley Lab. Applied Physics and Laser Spectroscopy Group.
EFFECTS OF COMPENSATION ON LIGHT-INDUCED METASTABLE DEFECTS IN aSi:H
Nabil M. Amer, Andrew Skumanich, and Warren B. Jackson (Xerox Palo Alto Research Center, Calif.) Jul. 1983 7 p refs Presented at the 10th Intern. Conf. on Amorphous and Liquid Semiconductors, Tokyo, 22-26 Aug. 1983
(Contract DE-AC03-76SF-00098)
(DE83-016696; LBL-16452; CONF-830895-5) Avail: NTIS HC A02/MF A01

The effects of compensation of light induced defects in a-Si:H were investigated by photothermal deflection spectroscopy. It is shown that fully compensated material exhibits the smallest increase in defects after illumination. Departure from full compensation leads to a significant rise in the defect density. It is indicated that the observed change in the density of defects is due to new Si dangling bonds and not to Fermi level shifts. The implication of the findings for solar cell technology is discussed. DOE

N84-13681# Los Alamos Scientific Lab., N. Mex.
CHEMICAL CONVERSION SURFACES FOR SOLAR-ENERGY APPLICATIONS
S. W. Moore, J. S. Clements, and W. R. Doty Aug. 1983 58 p refs
(Contract W-7405-eng-36)
(DE84-000107; LA-9842-MS) Avail: NTIS HC A04/MF A01

An attempt is made to determine which coatings and substrate combinations might hold the greatest promise for chemical conversion coating of substrate materials. The following substrate materials are investigated: aluminum, copper, brass, zinc, cadmium, aluminum/zinc alloys, nickel, iron, and stainless steel. One of the major impediments to the utilization of solar energy is the initial cost of the systems. One mechanism for reducing this initial cost is reduction of component costs. Present-day selective coatings are relatively expensive, costing $10 to $20/m(2) ($1 to $2 per ft(2)). Chemical conversion coating of substrate materials is a means by which selective coatings might be produced for low-temperature active and passive applications at a low cost. Some researchers have predicted chemical costs of only a few cents per ft(2). Much information is needed for both optical property optimization and durability to see if any of these coatings might hold promise for solar applications. DOE

N84-13682# Sun Designs, Glen Moore, Pa.
FLAT-PLATE SOLAR-COLLECTOR PERFORMANCE DATA BASE AND USER'S MANUAL
Donald L. Kirkpatrick and William A. Kolar, ed. (Solar Energy Research Inst.) Jul. 1983 221 p
(Contract DE-AC02-77CH-00178)
(DE83-011993; SERI/STR-254-1515) Avail: NTIS HC A10/MF A01

The reader is provided with a thorough understanding on the type of collector thermal performance information which is required in active system design and analysis. Thermal performance test data on 109 commercially available solar collectors which were evaluated in a single, uniform test program, the Interim Solar Collector Test (ISCT) Program are given. In addition to recounting the ISCT program and its results, the an introduction is given on the engineering and physics of a flat-plate solar collector operation. A step-by-step analysis of heat gains and losses is provided to help the reader understand both the source and applicability of the parameters used to describe collector thermal performance. A brief description of the engineering basis for the ASHRAE Standard 93-77 test procedure and the method are included. To demonstrate

the sensitivity to variations of collector performance parameters of the annual output of representative solar heating systems, three sets of F-Chart (4.0) system performance predictions are given. Finally, a sensitivity analysis study is presented which considers the heat loss and optical gain parameters of flat-plate collectors, in terms of how they affect the overall solar heating system solar fraction. DOE

N84-13683# Donovan, Hamester and Rattien, Inc., McLean, Va.
PHOTOVOLTAIC-CELL-RESEACH PRIORITIES
Jonathan G. Bornstein, Le Khac Hien, and Richard Silberglitt 30 Sep. 1983 152 p refs
(Contract DE-AC01-82ER-30029)
(DE84-000066; DOE/ER-30029/T1) Avail: NTIS HC A08/MF A01

The current state of research and development on photovoltaic materials and advanced concepts are reviewed, and priority research activities for improved photovoltaic cells in the major individual research areas are identified. The major features of a research management philosophy aimed at attracting the best available scientific resources and research capabilities to photovoltaic research and development are outlined. The priority research activities in the principal areas of photovoltaic research are summarized. DOE

N84-13684# Oak Ridge National Lab., Tenn. Solid State Div.
UPDATE OF PULSED-LASER PROCESSING TECHNOLOGY FOR HIGH-EFFICIENCY SILICON SOLAR CELLS
R. T. Young, G. A. vanderLeeden, R. F. Wood, and R. D. Westbrook Sep. 1982 5 p refs Presented at the 16th IEEE Photovoltaic Specialists Conf., San Diego, Calif., 27-30 Sep. 1982
(Contract W-7405-eng-26)
(DE84-000638; CONF-820906-40) Avail: NTIS HC A02/MF A01

Advances in the pulsed laser processing of silicon solar cells are described. These include: the use of a XeCl laser to avoid the need for the beam homogenizers and substrate heating used with solid state lasers, the further development of low cost gaseous discharge implantation equipment, and the use of P-diffusion for back surface field formation instead of laser damage gettering followed by laser induced diffusion of antimony. DOE

N84-13685# Lockheed Missiles and Space Co., Palo Alto, Calif.
EVALUATION OF SELECTIVE SOLAR-ABSORBER SURFACES, PHASE 2 Final Technical Report, 1 Oct. 1980 - 30 Jun. 1982
R. A. Osiecki Sep. 1982 92 p refs
(Contract DE-AC04-78CS-15361)
(DE84-000067; LMSC-D-876763) Avail: NTIS HC A05/MF A01

Samples of black chrome, copper oxide, nickel oxide, chromate conversion coating, and a thickness sensitive paint were exposed to 900C/95% relative humidity (RH), 900C/low RH for up to 5000h. The optical, chemical and surface morphological characteristics of the samples were monitored at various times during the exposures. The copper oxide surface finish was the least environmentally stable finish. During exposure to the 900C/95% RH environment, the spectral reflectance of the finish progressively increased below the near infrared and decreased at longer wavelengths, the copper oxidized from the 0 and +1 valence states to +2, and the surface finish became more porous. Similar but smaller changes were noted in the samples exposed to the natural environment in a collector box for 9.5 months. The properties of the samples exposed to 900C/low RH did not significantly change. The black chrome surface finish changed slightly during the first 1250h of exposure to the 900C/low RH environment. Additional results are given. DOE

N84-13686# Shirley (Jeff W.), Columbia, S.C.
HYBRID SPACE HEATING/COOLING SYSTEM WITH TROMBE WALL, UNDERGROUND VENTING, AND ASSISTED HEAT PUMP
Jeff W. Shirley, Larry C. James, Steve Stevens, Aulton N. Autry, Morris Nussbaum, and Stephan V. McQueen 22 Jun. 1983 51 p refs
(Contract DE-FG44-80R4-10224)
(DE84-000406; DOE/R4-10224-T1) Avail: NTIS HC A04/MF A01

A hybrid solar system/ground loop which automatically assists the standard, thermostatically controlled home heating/cooling system was designed and monitored. The input from the homeowner was limited to normal thermostat operations. During the course of the project it was determined that to effectively gather data and control the various component interactions, a microcomputer based control system would also allow the HVAC system to be optimized by simple changes to software. This flexibility in an untested concept helped us to achieve optimum system performance. Control ranged from direct solar heating and direct ground loop cooling modes, to assistance of the heat pump by both solar space and ground loop. Sensors were strategically placed to provide data on response of the Trombe wall (surface, 4 in. deep, 8 in. deep), and the ground loop (inlet, 3/4 length, outlet). Microcomputer hardware and computer programs were developed to make cost effective decisions between the various modes of operation. DOE

N84-13687# Sandia Labs., Albuquerque, N. Mex. Photovoltaic Concentrator Research Div.
PHOTOVOLTAIC CONCENTRATORS: RECENT DEVELOPMENTS
E. C. Boes 1983 7 p refs Presented at the Photovoltaic Solar Energy Conf., Athens, 17 Oct. 1983
(Contract DE-AC04-76DP-00789)
(DE84-001641; SAND-83-2219C; CONF-831028-1) Avail: NTIS HC A02/MF A01

Performance and reliability data on several PV concentrator array fields are presented. The fields which use Fresnel lens concentrators are operating very well, with typical field operating efficiencies of 8 to 10% and no serious power degradation to report. Three achievements in the area of module research are reported. Commercial modules whose peak (280 C cell temperature, 800 W/m(2) conversion efficiency is above 15% and a 200 X experimental module using Si cells that is likely to have a peak efficiency of 16.5% (individual lens-cell units have efficiencies between 16.5 and 17%) were developed. Varian's passively cooled 1000X GaAs module was reared at 17% peak efficiency. The results of a comprehensive study of the effects of real solar spectral variations on the annual performance of 2-cell multijunction devices and the cost-effectiveness of future concentrator module technologies using Si, GaAs, and AlGaAs/Si multijunction concentrator cells are reported. DOE

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N84-13688*# Virginia Polytechnic Inst. and State Univ., Blacksburg.
CONTINUED RESEARCH ON SELECTED PARAMETERS TO MINIMIZE COMMUNITY ANNOYANCE FROM AIRPORT NOISE Final Report, Apr. 1981 - Mar 1982
Les Frair 1982 64 p
(Grant NsG-1598-Suppl-3)
(NASA-CR-174607; NAS 1.26:174607) Avail: NTIS HC A04/MF A01 CSCL 13B

A mathematical model of the annoyance created at an airport by aircraft operations is developed. The model incorporates population distribution considerations around an airport and the annoyance caused by aircraft noise. The objective function of this model corresponds to seeking to minimize total population annoyance created by all aircraft operations in a 24-hour period. Several factors are included in this model as constraint bounded. Demand for flight services is incorporated by including lower bounds on the number of operations by type of aircraft, runway used and time period. Also upper bounds on the number of operations for each runway are included. The mathematical model as formulated

is recognized as corresponding to a nonlinear integer mathematical programming problem. Author

N84-13689# California Univ., Livermore. Lawrence Livermore Lab.

ATMOSPHERIC DISPERSION OF AMMONIA: AN AMMONIA FOG MODEL

E. J. Kansa, D. L. Ermak, S. T. Chan, and H. C. Rodean Jul. 1983 32 p refs Presented at 21th ASME/AIChE Natl. Heat Transfer Conf., Seattle, 24 Jul. 1983 Revised

(Contract W-7405-eng-48)

(DE84-000165; UCRL-88649-Rev-2; CONF-830702-7-Rev-2) Avail: NTIS HC A03/MF A01

The atmospheric dispersion of ammonia resulting from a high pressure release is discussed. The resulting nature of two phase cloud of ammonia vapor and droplets has a significant effect on its dispersion characteristics. Our calculations of a 40 ton release show that even under moderately high wind conditions, the resulting ammonia cloud remains negatively buoyant for considerable distances downwind. DOE

N84-13690# Argonne National Lab., Ill.

OXYGEN-18 MEASUREMENTS IN THE ASSESSMENT OF NATURAL AND ANTHROPOGENIC SULFUR IN THE ENVIRONMENT

B. D. Holt and R. Kumar Sep. 1983 18 p refs Presented at Intern. Workshop on Stable Isotopes in the Assessment of Nat. and Antropogenic Sulfur in the Environ., Pushchino, USSR, 9 Sep. 1983

(Contract W-31-109-eng-38)

(DE84-000566; CONF-8309150-1) Avail: NTIS HC A02/MF A01

Oxygen isotope ratio measurements are uniquely applicable to the study of mechanisms of formation of natural or man made sulfates found in the environment. As SO2 is gradually converted to sulfate in a given air mass, the fraction of primary sulfate in the mixture necessarily decreases. Measurements of delta(18)O of sulfates and associated waters can be applied to the study of bacterial, chemical and physical processes which regulate the steady state balance of the sulfur oxygen system in the oceans. Applications of delta(18)O measurements can also be made to determine whether the sulfates in certain ground waters originate from solution of evaporite sulfates or from aqueous air oxidation of sulfides. DOE

N84-13691# Department of Energy, Washington, D. C. Office of Health and Environmental Research.

ECOLOGICAL RESEARCH DIVISION MARINE RESEARCH PROGRAM

Aug. 1983 75 p

(DE83-017880; DOE/ER-0161) Avail: NTIS HC A04/MF A01

The marine research program focuses on two major environmental issues facing development and expansion of most energy technologies: waste disposal and siting/operations. Studies are designed to provide answers concerning mobilization of contaminants, their migration, concentration, and fate as well as their effects on the marine environment, including pathways back to human populations. In addition, pressures for siting energy facilities in coastal areas continue to increase and competing demands on the environment must be balanced. Thus, an integrated, multidisciplinary program is being conducted which combines research on transport and fate of contaminants with studies on water mass movements and ecosystem structure and function. DOE

N84-13692# Oak Ridge National Lab., Tenn. Environmental Sciences Div.

CALIBRATION OF LABORATORY BIOASSAYS WITH RESULTS FROM MICROCOSMS AND PONDS

Jeffrey M. Giddings and Paul J. Franco 1983 33 p refs Presented at the Symp. on Validation and Predictability of Lab Methods for the Assessment of Effects on Environ. Contaminants in Aquatic Ecosystems, Grand Forks, N.D.

(Contract W-7405-eng-26)

(DE83-017224; CONF-8306124-1) Avail: NTIS HC A03/MF A01

Effects of an organic contaminant (a synthetic coal derived crude oil) were measured in outdoor ponds and indoor pond derived microcosms and compared with results of laboratory bioassays. Ponds and microcosms were treated with the oil continuously for 8 weeks. Concentrations of phenolic compounds (the major water soluble constituents of the oil) spanned the range of acute and chronic toxicity concentrations determined in single species bioassays. Effects were similar in microcosms and ponds, implying that microcosms are suitable models for field studies for some purposes. Significant changes in community metabolism and zooplankton populations occurred in microcosms and ponds exposed to less than 0.05 mg litre phenols, near the 28 day lowest Observed Effect Concentration for Daphnia magna. Ponds and microcosms were seriously damaged at concentrations near acute bioassay LC50 values. Indirect effects in the ecosystems occurred at all treatment levels, and included changes in water quality, replacement of sensitive taxa by more tolerant competitors, and changes in abundance of some species because of increases or decreases in their predators or grazers. DOE

N84-13693# Argonne National Lab., Ill. Energy and Environmental Systems Div.

THE EFFECTS OF RELAXING AUTOMOBILE EMISSION STANDARDS: A GENERIC ANALYSIS AND AN URBAN CASE STUDY

C. L. Saricks, M. K. Singh, S. J. LaBelle, K. M. Novak (Brookhaven National Lab.), and M. D. Rowe (Brookhaven National Lab.) Jan. 1983 145 p refs

(Contract W-31-109-eng-38)

(DE84-000193; ANL/ES-133) Avail: NTIS HC A07/MF A01

Policy impact modeling procedures were used to assess the effects of relaxing automotive emission standards for carbon dioxide (CO) and nitrogen oxides (NO/sub x/) through 1986 to those levels in effect for 1980 model year automobiles. The effects were compared with those resulting from retention of the current, more stringent emission standards with respect to automobile characterization, distribution of automobiles stock and sales by size class and technology, urban travel demand, and total energy consumption. A metropolitan area was analyzed to estimate total vehicle emissions, project average ambient concentrations of NO/sub x/, and examine the NO/sub x/-related health effects resulting from the relaxation of emission standards. A powerful latent market for cost competitive vehicles with lower operating costs than comparable gasoline or diesel powered cars but only slightly inferior performance were identified. It is shown that NO/sub x/ concentrations harmful to health generally occurred only in houses with gas stoves or in the interiors of vehicles in dense traffic and that retention of the current NO/sub x/ standards could produce an 18% decrease in health effects for vehicle occupants.

N84-13694# Environmental Protection Agency, Corvallis, Oreg. Environmental Research Lab.

IMPACT OF ENHANCED SOLAR UV-B RADIATION UPON THE MARINE ECOSYSTEM

Robert C. Worrest Aug. 1983 11 p refs Presented at the Intern. Workshop on Biol. Effects of UV-B radiation, Munich, 25-27 May 1982

(PB83-247411; EPA-600/D-83-101) Avail: NTIS HC A02/MF A01 CSCL 06R

Studies into the biological stress caused by the previously slighted short-wavelength edge of the global solar spectrum are discussed. Stratospheric ozone functions 220-320 nm waveband as it penetrates through the atmosphere, thus allowing only small amounts of the longer wavelengths of radiation in this waveband to leak through to the surface of the Earth. Although this radiation (UV-B radiation, 290-320 nm) comprises only a small fraction (less than 1%) of the total solar spectrum, it can have a major impact on biological systems due to its actinic nature. Effects on marine ecosystems are discussed. Author (GRA)

N84-13695# Southern Research Inst., Birmingham, Ala.

MATHEMATICAL MODEL OF ELECTROSTATIC PRECIPITATION FOR THE TEXAS INSTRUMENTS PROGRAMMABLE 59

CALCULATOR Final Report, Jul. - Dec. 1981
M. G. Faulkner and J. R. McDonald Sep. 1983 132 p refs (Contract EPA-68-02-2683)
(PB83-261669; SORI-EAS-81-232; EPA-600/7-83-050) Avail: NTIS HC A07/MF A01 CSCL 13B

The report describes a version of EPA's electrostatic precipitator (ESP) model suitable for use on a Texas Instruments Programmable 59 (TI-59) hand-held calculator. This version of the model allows the calculation of ESP collection efficiency, including corrections for non-ideal effects and rapping reentrainment in five size bands. Program input data and the individual and total collection efficiencies are printed on a TI Thermal Printer. This model is described in detail, including program steps for its use. This version and the full-scale model are compared. Author (GRA)

N84-13696# Environmental Protection Agency, Research Triangle Park, N.C. Emission Standards and Engineering Div.
PERFORMANCE SPECIFICATIONS FOR CONTINUOUS MONITORING OF TOTAL REDUCED SULFUR EMISSIONS (PROPOSED JULY 20, 1981, 46 FR 37287), SUMMARY OF COMMENTS AND RESPONSES
Jul. 1983 14 p
(PB83-251009; EPA-450/3-82-018) Avail: NTIS HC A02/MF A01 CSCL 14B

This document addresses the public comments submitted after proposal of the performance specification in the Federal Register. Changes made to the methods as a resul of these comments are included. This document serves as the basis for the revisions which have been made to the performance specification between proposal and promulgation. Author (GRA)

N84-13697# Sonoma Technology, Inc., Santa Cruz, Calif.
CHARACTERIZATION OF REACTANTS, REACTION MECHANISMS AND REACTION PRODUCTS LEADING TO EXTREME ACID RAIN AND ACID AEROSOL CONDITIONS IN SOUTHERN CALIFORNIA Final Report, May 1981 - May 1983
L. W. Richards, J. A. Anderson, D. L. Blumenthal, S. L. Duckhorn, and J. A. McDonald Jun. 1983 95 p refs
(PB83-252825; ARB-R-83-198) Avail: NTIS HC A05/MF A01 CSCL 07D

Acid deposition has long been a source of concern in Scandanavia, and more recently became a source of concern in the northeastern United States and the Maritime Provinces of Canada (Likens 1976). Relatively little attention was given to acid deposition in California beyond the immediate vicinity of industrial operations until the work of Lijested and Morgan (1978, 1981), but it is now becoming clear that the likelihood of adverse impacts in California is great enough that the problem deserves study. This report contains the results of a study conducted by Meteorology Research, Inc. and Sonoma Technology, Inc. for the California Air Resources Board. An instrumented aircraft was used to collect cloudwater samples, filter samples of submicron aerosol, and make other air quality and meteorological measurements in stratus clouds near the industrial areas of Los Angeles. Author (GRA)

N84-13698# Georgia Univ., Aiken, S.C.
FATES AND BIOLOGICAL EFFECTS OF POLYCYCLIC AROMATIC HYDROCARBONS IN AQUATIC SYSTEMS Final Report, Jun. 1978 - May 1981
John P. Giesy, Steven M. Bartell, Peter F. Landrum, Gordon J. Leversee, and John W. Bowling Jul. 1983 245 p refs Sponsored in part by DOE
(PB83-250191; EPA-600/3-83-053) Avail: NTIS HC A11/MF A01 CSCL 06F

This research project was conducted to test the hypothesis that fates of polycyclic aromatic hydrocarbons (PAH) in ecosystems can be predicted by mecnistic simulation models based on easily measured properties of the compounds in this homologous series. To accomplish this goal our research effects were in four major areas: (1) development of a mechanistic, predictive simulation model based on kinetic rather than thermodynamic considerations; (2) development of analytical and quality assurance protocols for the extraction and qualification of PAH associated with biological and geological matrices; (3) laboratory studies to determine the vectors of and rate constants for uptake, depuration and biotransformation of PAH by aquatic organisms and sediments. These studies also examined the effect of PAH concentration, temperature and other exogenous factors on rate constants and determined whether rate constants were first order and (4) a microcosm study to compare the results of simulation and laboratory scale studies to a larger scale ecosystem study. Author (GRA)

N84-13699# Environmental Protection Agency, Grosse Ile, Mich. Large Lakes Research Station.
DYNAMIC MASS BALANCE OF PCB (POLYCHLORINATED BIPHENYLS) AND SUSPENDED SOLIDS IN SAGINAW BAY: A CASE STUDY
William L. Richardson, Robert Wethington, and V. Elliott Smith (Cranbrook Inst. of Science) Aug. 1983 45 p refs
(PB83-250308; EPA-600/D-83-092) Avail: NTIS HC A03/MF A01 CSCL 06F

In Saginaw Bay, Lake Huron, about 3.7 metric tons of PCB remain in the active sediment and inputs from the Saginaw River and atmospheric deposition contribute about 1.4 kg PCB per day. This paper presents an analysis of conditions in the bay during 1979 and a projection of future conditions using a dynamic mass balance model. The primary research questions addressed are: (1) whether simulation models of 'total PCB' are sufficiently accurate or whether refined models considering at least mixtures are necessary, (2) whether volatilization of PCB is occurring, and (3) what is the expected longevity of PCB in the system. GRA

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N84-13700 California Univ., San Diego.
ENERGIZATION OF IONS BY OBLIQUE DOUBLE LAYERS Ph.D. Thesis
Marian Elizabeth Greenspan 1983 188 p
Avail: Univ. Microfilms Order No. DA8315172

Upflowing ions which show evidence of both parallel and perpendicular energization often are observed above the auroral zone. Large, spatially limited electric fields with components both parallel and perpendicular to the Earth's magnetic field (oblique double layers) are observed in the same region. A scenario frequently invoked to explain how the ions gain both perpendicular and parallel kinetic energy is perpendicular acceleration by waves, subsequent conversion of perpendicular to parallel kinetic energy as ions move up the magnetic field lines, and possibly further acceleration by parallel electric fields. In this thesis, the trajectories of many ions crossing a simple oblique double layer model are computed. It is shown that oblique double layers may be another source of perpendicular as well as parallel kinetic energy for upgoing ions. Acceleration by a narrow oblique double layer can increase the perpendicular as well as the parallel energy of upflowing ions. Dissert. Abstr.

N84-13701 Catholic Univ. of America, Washington, D.C.
AN ANALYSIS OF ACOUSTIC AND SEISMIC WAVE RESONANCES Ph.D. Thesis
Godwin Chinemeri Igiri 1983 155 p
Avail: Univ. Microfilms Order No. DA8313949

Both the analysis of the resonances in acoustic reflection coefficients of multilayered viscoelastic media (using laboratory sized material samples) and the projection of such resonances and their concomitant surface waves into a global sample (the Earth) is considered. The acoustic wave propagation in given material samples (layers of sand, water and plastic plates) were measured previously. The resulting experimental data are here compared to the predictions of relevant acoustic and elastic wave

theory which incorporate both the shear and the longitudinal wave properties of the materials experimented on. The analysis is then extended to a global sample, the Earth, with reasonable assumptions on radial stratification. The associated multiply circumnavigating surface waves are considered and used to elaborate on the known connection between surface waves and normal modes. The eigenfrequency spectra of the Earth's free oscillations which determine the dispersion curves of both the phase and the group velocities, are analyzed. Dissert. Abstr.

N84-13702 Wisconsin Univ., Madison.
ANALYTICAL INVESTIGATION OF MESO-SCALE BOUNDARY LAYER FORCED BY SURFACE TEMPERATURE VARIATION IN A STRATIFIED SHEARED ATMOSPHERE Ph.D. Thesis
Suliman Mohamed El-Debailo 1982 81 p
Avail: Univ. Microfilms Order No. DA8313228

The effects of surface temperature variation mesoscale boundary layer under stratified sheared atmosphere are investigated using a linearized, two dimensional steady state model. The governing equations are: the classical Naveir Stokes equations, the thermodynamic equation, and the mass continuity equation. The model basic assumptions are: (1) the fuid is in hydrostatic balance and satisfied the Boussinesq approximations, (2) the large-scale is characterized by constant stratification and shear, (3) constant eddy diffusion coefficient, (4) the horizontal wind perturbation due to thermal forcing is much less than the prevailing large-scale wind. With these assumptions the above governing non-linear differential equations are linearized. The resulting equations are nondimensionalized, leading to a set of parameters. Using the two-term balance technique, three distinct boundary layers are found to coexist; the modified Edman layer, the intermediate layer and the modified Lineykin layer. Calculations are carried out for the perturbation flow fields under different thermal stratifications, eddy diffusion, large scale horizontal wind and wind shear. Dissert. Abstr.

N84-13703 California Univ., Los Angeles.
OBSERVATIONS AND THEORY OF IRREGULARITIES OF MIDDLE LATITUDE SPORADIC E LAYERS Ph.D. Thesis
Takashi Tanaka 1983 161 p
Avail: Univ. Microfilms Order No. DA8312038

Irregularities of the order of 6 meters in wavelength which are revealed by radar observation to be present in the E region of the middle latitude ionosphere were studied. Systematic observations of the irregularities were carried out at Iioka, Japan by using a 25 MHz radar and a multifrequency (4-64 MHz) radar during the years 1973 to 1977. The irregularities are observed to be field aligned structures to within the observational errors. They are closely associated with sporadic E (Es) layers and occur mostly in the lower E region near 100 km. The occurrence of irregularities is predominantly in the nighttime with a maximum at premidnight. Seasonal occurrence of these irregularities shows a summer maximum, minima in equinoxes and a secondary peak in winter. The irregularities move predominantly in the westward direction with speeds of the order of 60 m/s. North-south components of motion are observed with much less frequency. Dissert. Abstr.

N84-13704*# California Inst. of Tech., Pasadena. Seismological Lab.
IMPACT CRATERING AND SPALL FAILURE AT GABBRO
Manfred A. Lange, Thomas J. Ahrens, and Mark B. Boslough 1983 42 p refs
(Grant NGL-05-002-105)
(NASA-CR-174618; NAS 1.26:174618) Avail: NTIS HC A03/MF A01 CSCL 08G

Both hypervelocity impact and dynamic spall experiments were carried out on a series of well-indurated samples of gabbro. The impact experiments carried out with 0.04 to 0.2g, 5-6 km/sec projectiles produced deci-centimeter-sized craters and demonstrated crater efficiencies of 6/10 to the - 9 g/erg, and order of magnitude greater than in metal and some two to three times that of previous experiments on less strong igneous rocks. Most of the crater volume (some 60 to 80%) is due to spall failure. Distribution of cumulative fragment number, as a function of mass of fragments with masses greater than 0.1 gram yield values of b = d(log10N sub f)dlog10(m)of -0.5 to -0.6, where N sub f is the cumulate number of fragments and m is the mass of fragments. These values are in agreement or slightly higher than those obtained for less strong rocks and indicate that a large fraction of the ejectra resides in a few large fragments. Author

N84-13705*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
POSTGLACIAL REBOUND OBSERVED BY LAGEOS AND THE EFFECTIVE VISCOSITY OF THE LOWER MANTLE
David Parry Rubincam Feb. 1983 39 p refs Presented at the AGU Spring Meeting, Baltimore, 30 May - 3 Jun. 1983
(NASA-TM-84982; NAS 1.15:84982) Avail: NTIS HC A03/MF A01 CSCL 08G

Sixty-four observations of the orbital node made by the Lageos satellite over a five year time interval reveal an acceleration of (-8.1 + or 1.8) x 10 to the -8 power arcseconds day/2 due to a source which is not presently modeled in the GEODYN orbit determination computer program. This acceleration cannot be explained by the ocean tide with 18.6 year period, assuming it to be an equilibrium tide. Instead it seems to be due to postglacial rebound, which changes the J(2) coefficient in the spherical harmonic expansion of the earth's gravitational field at the rate of (-8.2 + or - 18) x 10 to the -19th power/s; this in turn accelerates the node. This rate does not agree with the -32 x 10 to the -19th power/s predicted by Wu and Peltier's (1982) L2 model, which has upper and lower mantle effective viscosities of 10 to the 21st and 22nd powers Pa's, respectively. it does agree well with their L1 model, which gives about 10 x 10 to the 19th power/s. Since the effective viscosity is 10 to the 21st power Pa s throughout the entire mantle in the L1 model, the results support the contentions that the effective viscosity is near 10 to the 21st power Pa s everywhere in the mantle, and this relatively low value for the effective viscosity may have permitted several degrees of polar wander due to glaciation during the Quaternary Ice Age.
A.R.H.

N84-13706*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PROCEEDINGS OF A WORKSHOP ON ASSESSMENT OF TECHNIQUES FOR MEASURING TROPOSPHERIC N SUB x O SUB y
Dec. 1983 63 p refs Workshop held in Palo Alto, Calif., 16-20 Aug. 1982
(NASA-CP-2292; L-15720; NAS 1.55:2292) Avail: NTIS HC A04/MF A01 CSCL 04A

Human impact on the troposphere, particularly on the regional to global scale is assessed. One area of required research is instrumentation development, which is aimed at improving the capability to measure important trace gases and aerosols which are key species in the major atmospheric biogeochemical cycles. To focus on specific needs, the Instrumentation Workshop for NxOy Tropospheric Species was conducted. The workshop discussed measurement needs and instrument capabilities for NxOy species, including NO, NO2, HNO3, HNO2, PAN, and NO3 aerosols. The status and measurement capabilities of various techniques (operational as well as conceptual) were discussed, along with future instrument and technology needs. S.C.L.

N84-13707# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
INTERPRETATION OF AEROMAGNETIC ANOMALIES OF THE QUADRILATERO FERRIFERO REGION [INTERPRETACAO DE ANOMALIAS AEROMAGNETICAS DA REGIAO DO QUADRILATERO FERRIFERO]
Antonio Lopes Padilha Oct. 1983 23 p refs In PORTUGUESE; ENGLISH summary Submitted for publication
(INPE-2897-PRE/416) Avail: NTIS HC A02/MF A01

The methodology for geophysical interpretation of magnetic anomalies was applied to aeromagnetic data from the Quadrilatero Ferrifero (MG). Isolated anomalies associated with some of the

main structural features of the region (Itabira District, Ouro Fino and Gandarela synclines) were analyzed. The obtained results indicate a possibility of high induced and remanent magnetization in the local. Author

N84-13708# Naval Research Lab., Washington, D. C. Optical Sciences Div.
COMPUTED SURVEY SPECTRA OF 2-5 MICRON ATMOSPHERIC ABSORPTION Interim Report
D. H. Leslie and P. S. LeBow 31 Aug. 1983 84 p
(RF68342801)
(AD-A132526; NRL-MR-5168) Avail: NTIS HC A05/MF A01 CSCL 04/1

Computed high resolution survey spectra of atmospheric absorption coefficient vs wavenumber are presented covering the wavelength region 2-5 micrometers. The 1980 AFGL atmospheric absorption parameter compilation was employed with a mid-latitude, sea-level atmospheric model. GRA

N84-13709# Naval Postgraduate School, Monterey, Calif.
AN ANALYSIS OF pC-3 MICROPULSION IN THE GEOMAGNETIC FIELD M.S. Thesis
Kurt B. Stevens Jun. 1983 142 p
(AD-A132443) Avail: NTIS HC A07/MF A01 CSCL 08/14

The Naval Postgraduate School has an ongoing effort to study geomagnetic noise and micropulsations in the ULF frequency range ($.05 < f < 10$ Hz). Data is collected by three orthogonally mounted coils at a remote land site and telemetered to the laboratory for computer analysis. To isolate data containing a micropulsation event, time series plots of the magnetic field were generated. The development of a double running average routine made possible the isolation of micropulsations in large data sets. A type PC-3 micropulsation was found and the coherence, ellipticity and polarization properties were determined as follows: Coherence = 0.99, Degree of Polarization = 0.99 and the micropulsation was elliptically polarized. Power spectral density (PSD) plots summarizing data segments about two hours long occasionally contained structures found to be artificial and not representative of natural phenomena in the geomagnetic field. Methods to avoid this anomalous behavior in PSD plots are suggested. Author (GRA)

N84-13710# Global Marine Development, Inc., Irvine, Calif.
MARINE SEISMIC SYSTEM(MSS) DEPLOYMENT. PHASE IV: INVESTIGATION OF TECHNIQUES AND DEPLOYMENT SCENARIOS FOR INSTALLATION OF TRI-AXIAL SEISMOMETER IN A BOREHOLE IN THE DEEP OCEAN Final Report, 1 Oct. 1981 - 11 Dec. 1982
Robert L. Wallerstedt 31 May 1983 149 p
(Contract N00014-82-C-0017; ARPA Order 4042)
(AD-A132300; MSSA02-SYS-R003) Avail: NTIS HC A07/MF A01 CSCL 17/10

This report presents the results of the Phase IV fabrication & operations activities associated with the Marine Seismic System (MSS) at-sea demonstration accomplished in Aug-Sep 1982. The operations were conducted using the Deep Sea Drilling Project (DSDP) drillship Glomar Challenger for an estimated period of 30 days. The overall MSS deployment program plan & associated costs estimate have been upgraded to reflect the emplacement of a borehole and the deployment of a configuration I BIP(Borehole Instrumentation Package) system in the South Pacific during the period of Feb 1983. GRA

N84-13711# Defence Research Establishment Valcartier (Quebec).
AEROSOL SIZE DISTRIBUTION USING THE EXTINCTION-SEDIMENTATION INVERSION TECHNIQUE
G. Roy Nov. 1982 47 p In FRENCH; ENGLISH summary
(AD-A132158; AD-E850405; DREV-R-4278/82) Avail: NTIS HC A03/MF A01 CSCL 04/1

The results of a feasibility study for determining aerosol size distribution using the extinction sedimentation inversion technique are presented. It is found that the height of the dissemination chamber, may affect the value of the results. GRA

N84-13712# Air Force Geophysics Lab., Hanscom AFB, Mass. Optical Physics Div.
AIR MASS COMPUTER PROGRAM FOR ATMOSPHERIC TRANSMITTANCE/RADIANCE CALCULATION: FSCATM Interim Report
W. O. Gallery, F. X. Kneizys, and S. A. Clough 9 Mar. 1983 142 p
(AF Proj. 7670)
(AD-A132108; AD-E800784; AFGL-TR-83-0065; AFGL-ERP-828)
Avail: NTIS HC A07/MF A01 CSCL 04/1

Calculations of atmospheric transmittance and radiance require the knowledge of the integrated amounts of the absorbing gases along the path. This report describes the calculation of the integrated amounts ('air mass' or 'column density') for various infrared absorbing gases for an arbitrary slant path through the atmosphere, including the effects of both curvature and refraction, and presents a Fortran program. FSCATM, to perform the calculation. Among the features of FSCATM are: 1. It calculates the layer-by-layer integrated absorber amounts and density-weighted pressure and temperature for an arbitrary slant path through the atmosphere. 2. It assumes a spherically symmetric atmospheric with exponential profiles of density and refractivity between layer boundaries. 3. It allows a variety of options for specifying the slant path. 4. It includes six representative atmospheric profiles of pressure and temperature, and of density for the gases H2O, CO2, O3, N2O, CO, CH3, and O2 and has provision for user-supplied profiles of up to 20 gases. 5. The output layering may either be generated internally or supplied by the user. 6. It is portable to 32 bit word computers in single precision and compatible with both ANSI Standard FORTRAN 66 and 77. 7. It is modular and easily modified to suit the users' particular needs. A discussion of atmospheric profile data and a survey of the literature are included in appendices. Author (GRA)

N84-13713# Air Force Geophysics Lab., Hanscom AFB, Mass. Aeronomy Div.
ON THE DETERMINATION OF THE INDEX OF REFRACTION OF THE ATMOSPHERE Interim Report
Samuel P. Zimmerman and Thomas J. Keneshea 1 Mar. 1983 17 p
(AF Proj. 6690)
(AD-A132107; AD-E800784; AFGL-TR-83-0067; AFGL-PSRP-666)
Avail: NTIS HC A02/MF A01 CSCL 04/1

The index of refraction of radio and optical waves in the lower atmosphere are examined in this note. Relations are derived between neutral density fluctuations and radar and optical reflectivity that results in reasonable values of C sub n squared, the refractivity structure constant. An alternative formulation of C sub n squared is derived using the mean atmospheric density structure and the rate of turbulent dissipation. The resulting values of C sub n squared are very near those calculated from the fluctuation analysis. Author (GRA)

N84-13714# Sandia Labs., Albuquerque, N. Mex. Thermomechanical and Physical Div.
STRESS-WAVE EXPERIMENTS ON SELECTED CRUSTAL ROCKS AND MINERALS
Dennis E. Grady Sep. 1983 44 p refs
(Contract DE-AC04-76DP-00789)
(DE84-001613; SAND-83-1898) Avail: NTIS HC A03/MF A01

Large amplitude compressive stress wave experiments on selected crustal rocks and minerals was performed. The materials studied included Vermont marble, Blair dolomite, Oakhall limestone, z-cut calcite and oil shale. In each case specific constitutive features were studied. Features include interrelation of plastic yielding and phase transformation, rate dependent plastic flow, dilatency under dynamic loading conditions, and energy dissipation at stress amplitudes below measured Hugoniot elastic limits. A new experimental method using inmaterial mutual inductance magnetic gauges is also described. DOE

N84-13715# Du Pont de Nemours (E. I.) and Co., Aiken, S.C. Environmental Sciences Dept.
SRL TETHERSONDE AND ECHOSONDE DATA, ANDERSON CREEK VALLEY, CALIFORNIA
James F. Schubert Sep. 1983 18 p refs
(Contract DE-AC09-76SR-00001)
(DE84-001680; DP-1650) Avail: NTIS HC A02/MF A01

This data report on nocturnal drainage winds in Anderson Creek Valley of northern California documents the efforts off the Savannah River Laboratory (SRL), in a multilaboratory study sponsored by the Department of Energy. This study was undertaken during September 1980 to quantify the physical parameters of nocturnal drainage winds in complex terrain. Data listings were obtained in this report from a tethersonde and a Doppler acoustic ecohosonde located at Rancho Tranquillo, UTM Coordinates, North 4292.2, East 526.1, elevation 526 meters. DOE

N84-13716# Geological Survey, Denver, Colo.
GEOLOGY OF FAULTS EXPOSED IN TRENCHES IN CRATER FLAT, NYE COUNTY, NEVADA
W. C. Swadley and D. L. Hoover 1983 19 p refs
(Contract DE-AI08-78ET-44802)
(DE84-000181; USGS-OFR-83-608) Avail: NTIS HC A02/MF A01

Three trenches excavated across two faults along the eastern edge of Crate Flat were studied and it was indicated that the main fault movement offset unit QTa in trench 1 at least 2.4 m down to the west, and occurred about 1.1 m.y. ago, as shown by included basalt ash. Later fault movement, detected in trench 3, and probably related to the faulting at trench 1, displaced unit Q2c a combined distance of 0.8 m down to the west along three faults. Fault movement at trench 3 occurred sometime after 260,000 years ago and before about 40,000 years, but the evidence favors an age that is closer to the older date. DOE

N84-13717# Argonne National Lab., Ill. Environmental Research Div.
SURFACE HEAT FLUX DERIVED FROM SODAR AMPLITUDE AND FREQUENCY DATA: A COMPARISON
R. L. Coulter, M. L. Wesely, K. H. Underwood (Florida State Univ.), and T. J. Martin 1983 15 p refs Presented at the 2nd Intern. Symp. on Acoustic Remote Sensing of the Atmosphere and Ocean, Rome, 29 Aug. 1983
(Contract W-31-109-eng-38)
(DE83-017930; CONF-8308117-2) Avail: NTIS HC A02/MF A01

The structure of the atmospheric boundary layer undergoes large diurnal variations that are important in the diffusion and dispersion of pollutants, development of convection and rainfall, and the air surface exchange of momentum, moisture, and trace substances. Estimates of the flux of energy from the Earth's surface to the atmosphere are important for the operation of models attempting to predict the daily development of the planetary boundary layer (PBL). In complicated terrain or for estimates above the surface layer however, a volume of area average is a potentially more useful estimate since the uncertainties introduced by inhomogeneities and statistical variability are reduced. The surface heat flux which was estimated previously the temperature structure parameter C/sub T/(2) and from estimates of the variance of vertical velocity sigma/sub w/. These two techniques are compared with eddy correlation point estimates made under convective conditions in the vertical observations involving convective exchange (VOICE) experiment together with the dry deposition intercomparison experiment (DDIE), which supplied complete measurements of surface layer parameters including winds, temperatures, humidities, sensible heat flux H/sub c/, and latent sensible heat flux L/sub w/E. DOE

N84-13718# Argonne National Lab., Ill.
A COMPARISON OF FREQUENCY DETERMINATION USING REAL SODAR DATA
R. L. Coulter, T. J. Martin, and K. H. Underwood (Florida State Univ., Talahassee) 1983 16 p refs Presented at the 2nd Intern. Symp. on Acoustic Remote Sensing of the Atmosphere and Ocean, Rome, 29 Aug. 1983
(Contract W-31-109-eng-38)
(DE83-017942; CONF-8308117-1) Avail: NTIS HC A02/MF A01

Several techniques for velocity or frequency estimation using two approaches were investigated. The development of frequency analysis of sodar signals has progressed from early tracking filter estimates of the frequency of the strongest signal as a function of time, to the full frequency spectrum at each range gate presented in real time. The calculated wind velocities are a function of the way in which the time series representing the information within the range gate is treated. The differences can be significant for specialized applications and might lead to different theoretical interpretations of the turbulent velocity field. Relative differences are explored with actual experimental data obtained under convective conditions. Absolute differences are explored using an artificial signal imbedded in atmospheric noise. DOE

N84-13719# Los Alamos Scientific Lab., N. Mex.
NEVADA TEST SITE SEISMIC-TELEMETRY MEASUREMENTS
James N. Albright, Larry E. Parker, and Everett H. Horton Aug. 1983 38 p refs
(Contract W-7405-eng-36)
(DE84-000447; LA-9840-MS) Avail: NTIS HC A03/MF A01

The feasibility and limitations of surface to tunnel seismic telemetry at the Nevada Test Site were explored through field measurements. Range functions for signaling were determined through analysis of monofrequency seismic signals injected into the earth at various sites as far as 70 km (43 mi) from installations of seismometers in the G-Tunnel complex of Rainier Mesa. Transmissions from 58 surface sites distributed primarily along three azimuths from G-Tunnel were studied. The G-Tunnel noise environment was monitored over the 20 day duration of the field tests. Noise power probability functions were calculated for 20-s and 280-s seismic-record populations. Signaling rates were calculated for signals transmitted from superior transmitter sites to G-Tunnel. DOE

N84-13720# Pacific Northwest Lab., Richland, Wash.
MOBILITY OF ORGANIC COMPLEXES OF NICKEL AND COBALT IN SOILS
J. L. Swanson Sep. 1983 68 p refs
(Contract DE-AC06-76RL-01830)
(DE83-017897; PNL-4796) Avail: NTIS HC A04/MF A01

The effect of organic complexing agents on the behavior of low-level waste radionuclides in soil/groundwater systems is discussed. Sorption of some complexed radionuclides, as well as of uncomplexed ones, is important with some soils. Sorption of Ni-EDTA and Co-EDTA complexes occurs with soils from Oak Ridge and Savannah River. The sorption of these kinetically inert complexes results in a lower radionuclide migration rate than if it did not occur; however, the migration rate is still greater than if the complexes were not kinetically inert, or if complexants were absent. The comparison of complexing agents was also extended in FY 1983 to include additional individual agents and also some proprietary decontamination mixtures. The results of tests continue to indicate that all organic complexing agents should not be considered to be equally hazardous from a waste disposal standpoint. Different soils affect organic complexant-enhanced radionuclide mobility differently. Some sorb kineticaly inert complexes and some do not. Radionuclide complexes dissociate more rapidly in some soil/groundwater systems than they do in others. Soils also differ in their leaching by complexant solutions, which also affects radionuclide behavior. DOE

N84-13721# Union Carbide Corp., Oak Ridge, Tenn. Nuclear Div.
RESPONSE OF THE NORTH AMERICAN CORN BELT TO CLIMATE WARMING, CO2
Aug. 1983 30 p refs
(Contract W-7405-eng-26)
(DE83-017873; DOE/NBB-0040) Avail: NTIS HC A03/MF A01

The climate of the North American corn belt was characterized to estimate the effects of climatic change on thaat agricultural

region. Heat and moisture characteristics of the current corn belt were identified and mapped based on a simulated climate for a doubling of atmospheric CO2 concentrations. The result was a map of the projected corn belt corresponding to the simulated climatic change. Such projections were made with and without an allowance for earlier planting dates that could occur under a CO2-induced climatic warming. Because the direct effects of CO2 increases on plants, improvements in farm technology, and plant breeding are not considered, the resulting projections represent an extreme or worst case. The results indicate that even for such a worst case, climatic conditions favoring corn production would not extend very far into Canada. Climatic buffering effects of the Great Lakes would apparently retard northeastward shifts in corn-belt location. DOE

N84-13722# California Univ., Livermore. Lawrence Livermore Lab.
COMMENTARY ON THE RECENT CO2-CLIMATE CONTROVERSY
Robert D. Cess and Gerald L. Potter (State Univ. of N.Y.) Jul. 1983 6 p refs Presented at the 5th Conf. on Atmospheric Radiation, Baltimore, 31 Oct. - 3 Nov. 1983
(Contract W-7405-eng-48; Grant NSF ATM-82-12791)
(DE83-016367; UCRL-89651; CONF-831069-1) Avail: NTIS HC A02/MF A01

The CO2-climate controversy arose when it was suggested that the climatic response to a CO2 doubling was smaller by a factor of P than findings generally accepted. This was further fueled when a small CO2-climate response based upon three empirically-deduced surface response functions was found. A reconciliation of the results is summarized within the current state-of-the-art of climate modeling. DOE

N84-13723# Oak Ridge National Lab., Tenn. Energy Div.
ATMOSPHERIC RETENTION OF ANTHROPOGENIC CO2: SCENARIO DEPENDENCE OF THE AIRBORNE FRACTION
Alfred M. Perry Jun. 1983 62 p refs
(Contract W-7405-eng-26; EPRI Proj. TPS-81-817)
(DE83-016854; DOE/NBM-3016854; ERD-81-159) Avail: NTIS HC A04/MF A01

Carbon dioxide production from fossil fuel combustion contributes to increases in the CO2 concentration in the Earth's atmosphere. The fraction of cumulative future CO2 production that will remain in the atmosphere, as a function of time, was calculated for nineteen hypothetical scenarios for worldwide CO2 production, using two quite different models of the global carbon cycle. Over a wide range of assumed values for total cumulative CO2 production and for initial (post-1980) rates of growth of annual CO2 production, the airborne fractions for the various scenarios correlate well with the maximum annual CO2 production rate attained in each scenario. For scenarios in which the peak CO2 production rate is 10 to 20 times the present rate, the airborne fraction may exceed 0.8; for scenarios with peak production rates 2 to 3 times the present rate, the airborne fraction is estimated to be around 0.6. Present carbon cycle models may not correctly estimate the distribution of CO2 among the major global carbon reservoirs, but the upward trend n airborne fraction with increasing annual carbon release rate is plausible and probably real. DOE

N84-13724# National Oceanic and Atmospheric Administration, Boulder, Colo.
GLACIOLOGICAL DATA: PERMAFROST. A BIBLIOGRAPHY, 1978 - 1982
Ann M. Brennan, comp. Jun. 1983 346 p Prepared in cooperation with Cooperative Inst. for Research in Environmental Science and Army Cold Regions Research and Engineering Lab., Hanover, N.H.
(PB83-249730; GD-14; NOAA-83081101; ISSN-0149-1776) Avail: NTIS HC A15/MF A01 CSCL 13B

Permafrost underlies at least 25 million sq km of Earth's surface. Permafrost, ground freezing, and frost heave pose major geotechnical problems for exploration and development in the northern lands. Consequently the subject is of considerable interest to scientists, engineers, and planners working in these cold environments. The topics of permafrost, ground ice, frozen soil, and geocryology are formally within the scope of interest for the World Data Center-A for Glaciology (Snow and Ice). The report includes over 4400 bibliographic entries compiled for this issue of Glaciological Data. Author (GRA)

N84-13725# Geological Survey, Champaign, Ill.
GEOLOGY OF CARBONATE AGGREGATE RESOURCES OF ILLINOIS, ILLINOIS MINERAL NOTES
Jonathan H. Goodwin 1983 18 p refs
(PB83-251140; IL/SGS/IMN-87) Avail: NTIS HC A02/MF A01 CSCL 08G

Carbonate rocks ranging in age from Pennsylvanian through Ordovician provide the principal resources for crushed stone production in Illinois. In the northern third of Illinois, dolomite and calcareous dolomite of the Silurian and Ordovician Systems from the bedrock surface are the basis of a large quarrying industry. One of the largest quarries in the United States wins stone from Silurian reefal dolomite at Thornton, near Chicago. Aggregate for skid-resistant asphalt pavement is produced from Devonian chert in extreme southern Illinois. Author (GRA)

N84-13726# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
ACOUSTIC-GRAVITY WAVE DISPERSION RELATIONS IN A BAROCLINIC ATMOSPHERE
R. M. Jones Jun. 1983 58 p
(PB83-248690; NOAA-TM-ERL-WPL-112; NOAA-83081104) Avail: NTIS HC A04/MF A01 CSCL 04A

Transforming the linearized inviscid Navier-Stokes equations to a symmetric hyperbolic system of partial differential equations leads to a unique dispersion relation for the propagation of acoustic-gravity waves in a baroclinic atmosphere. The dispersion relation differs from the usual one because of the presence of a baroclinic term. Additional changes are mentioned. It is argued that this dispersion relation be accepted as the standard for acoustic-gravity waves in either a baroclinic or a barotropic atmosphere. Author (GRA)

N84-13414*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A STUDY OF THE CHARGED PARTICLE CALIBRATION REQUIREMENTS FOR THE DEEP SPACE NETWORK
S. A. Townes *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 124-131 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 04A

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N84-13727 Washington Univ., Seattle.
A COMPOSITE ANALYSIS OF A TROPICAL SQUALL-LINE SYSTEM Ph.D. Thesis
John Frederick Gamache 1983 333 p
Avail: Univ. Microfilms Order No. DA8312138

The winds, vertical air motions, water budget and thermodynamic structures of a tropical squall-line system are analyzed using a composite of observations taken over a 9-h period. Radar-echo structure is used to place these observations relative to the region of deep convection along the squall line and relative to the broad region of stratiform precipitation which trailed the squall line. The wind analysis confirms the presence of a mesoscale updraft within the stratiform cloud and determines the strengths of the mesoscale updraft and of the mesoscale downdraft which lay beneath the stratiform cloud. The net vertical motion within the convective region was upward throughout the troposphere. The analysis has confirmed the distinctly different characters of the vertical motions within the stratiform and convective regions. Condensation within the mesoscale updraft produced 30-40% of

the total water and ice within the stratiform cloud, the remainder being transferred from the convective region. Dissert. Abstr.

N84-13728 Washington Univ., Seattle.
PRECIPITATION DEVELOPMENT IN MIDLATITUDE CYCLONES: A STUDY OF CLOUD STRUCTURES AND PROCESSES Ph.D. Thesis
Paul Haskins Herzegh 1983 236 p
Avail: Univ. Microfilms Order No. DA8312143

The vertical air motions, microphysical structures and precipitation growth mechanisms of some of the mesoscale rainbands found in mature Pacific cyclones were examined through Doppler radar, aircraft, rawinsonde and surface measurements. Warm frontal and wide cold frontal rainbands extending above the 0-C level were found to consist of an upper level seeder zone containing shallow (1 to 2 km) convective generating cells and a lower level feeder zone containing stratiform cloud. In the seeder zone, mixed phase conditions promoted particle growth by riming, deposition and appreciation. In the feeder zone, particle growth occurred primarily through deposition and aggregation. The fractions of total precipitation growth that occurred in the seeder and feeder zones were about 20 and 80%, respectively. Dissert. Abstr.

N84-13729 Washington Univ., Seattle.
A NUMERICAL STUDY OF CLOUD AND PRECIPITATION PROCESSES IN MESOSCALE RAINBANDS Ph.D. Thesis
Steven Allan Rutledge 1983 234 p
Avail: Univ. Microfilms Order No. DA8312168

Field studies conducted during CYCLES PROJECT have investigated the dynamical and microphysical processes operating in mesoscale rainbands within extratropical cyclones. Conceptual models of the cloud and precipitation mechanisms present in the various types of rainbands were developed. The test these conceptual models, a numerical modeling study was undertaken. The numerical simulations centered on warm frontal rainbands, characterized by a 'seeder-feeder' process, and the convective like narrow cold frontal rainband. The results of the model simulations confirm the conceptual models and provide new insights into the precipitation mechanisms operating in these rainbands. Hypotheses for the enhancement of precipitation by artificial seeding are suggested. Dissert. Abstr.

N84-13730*# Tennessee Univ. Space Inst., Tullahoma.
STATISTICAL ANALYSIS OF TURBULENCE DATA FROM THE NASA MARSHALL SPACE FLIGHT CENTER ATMOSPHERIC BOUNDARY LAYER TOWER ARRAY FACILITY
Walter Frost and Ming-Chang Lin Washington NASA Nov. 1983 390 p refs
(Contract NAS8-34627)
(NASA-CR-3737; NAS 1.26:3737) Avail: NTIS HC A17/MF A01 CSCL 04B

Statistical properties of atmospheric turbulence near the Earth's surface are presented. Emphasis is placed on the probability density distribution two point spatial correlation, length scale, and two point and single point spectrum. Comparison of the data with isotropic homogeneous models is made. In general, agreement with the models is poor. For the design of aircraft during operations in the lower levels associated with approach, takeoff, and terrain following, it appears necessary to improve existing models or develop new nonisotropic turbulence models. Author

N84-13731*# Hughes Aircraft Co., Culver City, Calif. Electro-Optical and Data Systems Group.
LIGHTNING MAPPING SENSOR STUDY Final Report
V. Norwood Jul. 1983 79 p
(Contract NAS8-34942)
(NASA-CR-170908; NAS 1.26:170908) Avail: NTIS HC A05/MF A01 CSCL 04B

A technology assessment to determine how a world-wide, continuous measurement of lightning could be achieved from a geostationary platform is provided. Various approaches to the detector sensors are presented. It was first determined that any existing detector chips would require some degree of modification in order to meet the lightning mapper sensor requirements. The elements of the system were then analyzed, categorized, and graded for study emphasis. The recommended approach for the lightning mapper sensor is to develop a monolithic array in which each detector cell has circuitry that implements a two-step photon-collecting method for a very high dynamic range with good measurement accuracy. The efficiency of the array is compatible with the use of a conventional refractive optics design having an aperture in the neighborhood of 7 to 10 cm. Author

N84-13732*# TRW Space Technology Labs., Redondo Beach, Calif.
LIGHTNING MAPPER SENSOR DESIGN STUDY Final Report
L. R. Eaton, C. W. Poon, J. C. Shelton, N. P. Laverty, and R. D. Cook Sep. 1983 153 p ref
(Contract NAS8-34941)
(NASA-CR-170909; NAS 1.26:170909) Avail: NTIS HC A08/MF A01 CSCL 04B

World-wide continuous measurement of lightning location, intensity, and time during both day and night is to be provided by the Lightning Mapper (LITMAP) instrument. A technology assessment to determine if the LITMAP requirements can be met using existing sensor and electronic technologies is presented. The baseline concept discussed in this report is a compromise among a number of opposing requirements (e.g., ground resolution versus array size; large field of view versus narrow bandpass filter). The concept provides coverage for more than 80 percent of the lightning events as based on recent above-cloud NASA/U2 lightning measurements. Author

N84-13733# National Electrical Engineering Research Inst., Pretoria (South Africa).
THE 1980 INTERNATIONAL AEROSPACE CONFERENCE ON LIGHTNING AND STATIC ELECTRICITY
R. B. Anderson Jul. 1982 22 p Conf. held in Oxford, England, 23-25 Mar. 1982
(CSIR-ELEK-249; ISBN-0-7988-1717-8) Avail: NTIS HC A02/MF A01

A conference covering the properties of natural lightning, interaction with aircraft, analytic techniques for hazard assessment, lightning testing and experimental techniques, aerospace electrostatics, round systems, and the protection of aerospace vehicles are discussed. N.W.

N84-13734# National Building Research Inst., Pretoria (South Africa).
AN ANALYSIS OF CLOUD COVER AT JOHANNESBURG, CAPE TOWN AND DURBAN, IN SOUTH AFRICA
I. H. Boyd 1982 21 p refs
(CSIR-NBRI-SR-BOU-60; ISBN-0-7988-2053-5) Avail: NTIS HC A02/MF A01

Cloud cover data from three South African cities are analyzed in order to indicate the relative occurrences of clear, cloudy, and overcast conditions and the likelihood of obtaining periods of one or more days during which the sky condition remains unchanged. The results show that the overcast sky (upon which the traditional daylight factor method of calculating interior lighting is based) occurs less frequently than either clear or cloudy skies during each season of the year skies during each season of the year at Johannesburg and Cape Town, and during winter at Durban. The monthly averages of cloud cover were correlated with those of sunshine duration. The correlation was linear but because the regression lines for the three stations were widely different, it is impossible to use one equation to predict cloud cover from sunshine duration for all three cities. Improved procedures for daylighting are reported. N.W.

N84-13735*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RAIN ESTIMATION FROM SATELLITES: AN EXAMINATION OF THE GRIFFITH-WOODLEY TECHNIQUE
A. J. Negri, R. F. Adler, and P. J. Wetzel Jan. 1983 43 p refs
Submitted for publication

(NASA-TM-84969; NAS 1.15:84969) Avail: NTIS HC A03/MF A01 CSCL 04B

The Griffith-Woodley Technique (GWT) is an approach to estimating precipitation using infrared observations of clouds from geosynchronous satellites. It is examined in three ways: an analysis of the terms in the GWT equations; a case study of infrared imagery portraying convective development over Florida; and the comparison of a simplified equation set and resultant rain map to results using the GWT. The objective is to determine the dominant factors in the calculation of GWT rain estimates. Analysis of a single day's convection over Florida produced a number of significant insights into various terms in the GWT rainfall equations. Due to the definition of clouds by a threshold isotherm the majority of clouds on this day did not go through an idealized life cycle before losing their identity through merger, splitting, etc. As a result, 85% of the clouds had a defined life of 0.5 or 1 h. For these clouds the terms in the GWT which are dependent on cloud life history become essentially constant. The empirically derived ratio of radar echo area to cloud area is given a singular value (0.02) for 43% of the sample, while the rainrate term is 20.7 mmh-1 for 61% of the sample. For 55% of the sampled clouds the temperature weighting term is identically 1.0. Cloud area itself is highly correlated (r=0.88) with GWT computed rain volume. An important, discriminating parameter in the GWT is the temperature defining the coldest 10% cloud area. The analysis further shows that the two dominant parameters in rainfall estimation are the existence of cold cloud and the duration of cloud over a point. B.W.

N84-13736*# Texas A&M Univ., College Station. Dept. of Meteorology.

THE INFLUENCE OF CONVECTIVE ACTIVITY ON THE VORTICITY BUDGET Final Report

Tamara L. Townsend and James R. Scoggins Washington NASA Dec. 1983 114 p refs

(Contract NAS8-33776)

(NASA-CR-3752; NAS 1.26:3752) Avail: NTIS HC A06/MF A01 CSCL 04B

The influence of convective activity on the vorticity budget was determined during the AVE VII and AVE-SESAME I periods. This was accomplished by evaluating each term in the expanded vorticity equation with twisting and tilting and friction representing the residual of all other terms. Convective areas were delineated by use of radar summary charts. The influence of convective activity was established by analyzing contoured fields of each term as well as numerical values and profiles of the various terms in convective and nonconvective areas. Vertical motion was computed by the kinematic method, and all computations were performed over the central United States using a grid spacing of 158 km. The results show that, in convective areas in particular, the residual is of comparable magnitude to the horizontal advection and divergence terms, and therefore, cannot be neglected. In convective areas, the residual term represents a sink of vorticity below 500 mb and a strong source near 300 mb. In nonconvective areas, the residual was small in magnitude at all levels, but tended to be negative (vorticity sink) at 300 mb. The local change term, over convective areas, tended to be balanced by the residual term, and appeared to be a good indicator of development (vorticity becoming more cyclonic). Finally, the shape of the vertical profiles of the term in the budget equation agreed with those found by other investigators for easterly waves, but the terms were one order of magnitude larger than those for easterly waves. Author

N84-13737# Range Commanders Council, White Sands Missile Range, N. Mex. Meteorology Group.

RANGE REFERENCE ATMOSPHERE 0-70 km ALTITUDE

Aug. 1983 216 p Supersedes RCC/MG-104-63

(AD-A132487; RCC/MG-366-83; RCC/MG-104-63) Avail: NTIS HC A10/MF A01 CSCL 04/2

The RRA contains tabulations for monthly and annual means, standard deviations, and skewness coefficients for windspeed, pressure, temperature, density, water vapor pressure, virtual temperature, and dewpoint temperature; the means and standard deviations for the zonal (U) and meridional (V) wind components; and the linear (product moment) correlation coefficient between the wind components. These statistical parameters are tabulated at the station elevation, at 1-km intervals from sea level to 30 km, and at 2-km intervals from 30 to 90 km. The wind statistics are given at approximately 10 m above the station elevations and at altitudes with respect to mean sea level thereafter. For those range sites without rocketsonde measurements, the RRAs terminate at 30 km altitude, or they are extended, if required, when rocketsonde data from a nearby launch site are available. There are four sets of tables for each of the 12 monthly reference periods and the annual reference period. GRA

N84-13738# Range Commanders Council, White Sands Missile Range, N. Mex. Meteorology Group.

WHITE SANDS MISSILE RANGE, NEW MEXICO RANGE REFERENCE ATMOSPHERE 0-70 km ALTITUDE

Aug. 1983 208 p

(AD-A132471; RCC/MG-365-83) Avail: NTIS HC A10/MF A01 CSCL 04/2

The RRA contains tabulations for monthly and annual means, standard deviations, and skewness coefficients for windspeed, pressure, temperature, density, water vapor pressure, virtual temperature, and dewpoint temperature; the means and standard deviations for the zonal (U) and meridional (V) wind components; and the linear (product moment) correlation coefficient between the wind components. These statistical parameters are tabulated at the station elevation, at 1-km intervals from sea level to 30 km, and at 2-km intervals from 30 to 90 km. The wind statistics are given at approximately 10 m above the station elevations and at altitudes with respect to mean sea level thereafter. For those range sites without rocketsonde measurements, the RRAs terminate at 30 km altitude, or they are extended, if required, when rocketsonde data from a nearby launch site are available. There are four sets of tables for each of the 12 monthly reference periods and the annual reference period. GRA

N84-13739# Dugway Proving Ground, Utah.

A VERTICAL WIND ANGLE STANDARD DEVIATION CALCULATION METHOD FOR THE UNSTABLE SURFACE BOUNDARY LAYER

Christopher Biltoft Aug. 1983 23 p

(AD-A132362; DPG-TR-83-401) Avail: NTIS HC A02/MF A01 CSCL 04/2

This report is an introduction to basic similarity theory arguments and the application of the theory to practical problems in diffusion. It is intended to assist individuals with only a passing acquaintance with diffusion theory in the planning and execution of diffusion and hazard studies. A fundamental diffusion problem is the dilution that results from turbulent vertical cloud growth. Vertical cloud growth is described by the standard deviation of the vertical distribution of cloud material (sigma z). Estimates of sigma z are frequently obtained from Pasquill-Turner (P-T) stability categories. Sigma z can also be calculated as the product of travel distance (x) and the standard deviation of the vertical wind angle (sigma e). An explicit functional relationship between sigma e and the stability parameter z/L, where z is height and L is the characteristic length, is derived from similarity theory. This functional relationship is verified on a set of precisely measured micrometeorological field data. The performance of similarity theory sigma e calculations and P-T estimates is subsequently tested using sigma e data collected at DPG. The similarity theory computations are shown to be substantially superior to the P-T sigma e estimates. Adoption of similarity theory arguments should materially improve Army testing and hazard prediction efforts involving atmospheric diffusion and transport processes. GRA

N84-13740# Pennsylvania State Univ., University Park.

DEVELOPMENT OF A TECHNIQUE FOR SHORT-TERM PREDICTION OF HYDROMETEORS USING ADVECTION AND PHYSICAL FORCING Interim Report

Gregory S. Forbes, John J. Cahir, Paul B. Dorian, Walter D. Lottes, and Kathy Chapman Mar. 1983 80 p

(Contract F19628-82-K-0023; AF Proj. 6670)
(AD-A132259; SR-1; AFGL-TR-83-0082) Avail: NTIS HC A05/MF A01 CSCL 04/2

This interim scientific report describes initial stages of a project to enable prediction of humidity and cloudiness in mesoscale areas and their short-term changes. The performance of the LFM-II humidity forecasts is evaluated as an indicator of large-scale humidity patterns and their changes. The usefulness of various meteorological parameters as potential predictors of cloudiness and cloudiness change is assessed through correlation studies. The predictor fields are compared to brightness and brightness change fields derived from satellite imagery. Interactive computer programs to obtain quantitative data from satellite imagery are described. The ability of a humidity estimation technique, using hourly surface weather observations, to diagnose radiosonde-derived humidity observations is evaluated. Experiments in forecasting nighttime convection are described. GRA

N84-13741# Naval Postgraduate School, Monterey, Calif.
QUASI-LAGRANGIAN DIAGNOSTICS APPLIED TO AN EXTRA-TROPICAL EXPLOSIVE CYCLOGENESIS IN THE NORTH PACIFIC M.S. Thesis
Wynn E. Calland Jun. 1983 155 p
(AD-A132213) Avail: NTIS HC A08/MF A01 CSCL 04/2

A case of explosive extratropical cyclogenesis in the North Pacific is analyzed employing quasi-Lagrangian diagnostic techniques in isobaric coordinates. The First GARP Global Experiment (FGGE) Level III-b data set from the European Center For Medium-range Weather Forecasting (ECMWF) is used in a synoptic investigation and mass and vorticity budget diagnostic evaluation of storm development. Mid-tropospheric positive vorticity advection (PVA) acts in concert with low-level thermal advection to enhance surface layer organization during the initial periods. Explosive development occurs under upper-level zonal flow when the surface system, developing along the low-level baroclinic zone, moves under the front left quadrant of a strong jet streak. Stability in the lower troposphere decreases steadily as an intense two-layer mass circulation is established. The divergence term provides the largest contribution to the vorticity tendency during explosive development due to substantial surface layer convergence and upper-level divergence. Author (GRA)

N84-13742# Air Force Environmental Technical Applications Center, Scott AFB, Ill.
AN AID FOR USING THE REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWOS) Final Report
Jun. 1983 69 p
(AD-A132186; AD-E850405; USAFETAC/TN-83/001) Avail: NTIS HC A04/MF A01 CSCL 04/2

This technical note is designed to acquaint forecasters, primarily at the detachment level, with the use of the Revised Uniform Summary of Surface Weather Observations (RUSSWO) which is prepared by the United States Air Force Environmental Technical Applications center (USAFETAC). This TN includes a brief explanation of each part of the RUSSWO together with reproductions of selected summaries. Exercises that stress procedures for extracting key climatic data are included for each reproduced climatological data summary. Some exercises introduce techniques for obtaining data that are not tabulated directly in the RUSSWO. In most cases, the page of exercises for a particular summary faces the summary to facilitate study. GRA

N84-13743# Sigma Research, Inc., Richland, Wash.
REPRESENTATIVENESS OF METEOROLOGICAL OBSERVATIONS
D. H. Pack, ed., A.A. Shepher, ed., and Carmen J. Nappo (NOAA, Oak Ridge, Tenn.) Feb. 1983 17 p refs Presented at the Methods for Comparing Precipitation Chem. Data Workshop, Rensselaerville, N.Y., 10-12 Aug. 1982
(Contract DE-AI05-76EV-03688)
(DE83-017699; CONF-820888-2) Avail: NTIS HC A02/MF A01

The representativeness of meteorological observations is discussed. In research, an understanding of representativeness is required to evaluate a large assortment of meteorological models and assess how well meteorological instruments sample atmospheric phenomena. In applications, representativeness affects interpretations of weather forecasts as functions of scale, site selection for wind and solar energy systems, and the designs of buildings and structures. It also is important in the regulation of air quality. A definition of representativeness is given. Possible ways of assessing representativeness are discussed. DOE

N84-13744# PRC Systems Services Co., McLean, Va.
COUNTY-LEVEL WIND RESOURCE ESTIMATES FOR DOE REGION 5 Final Report
B. S. Groveman and J. L. Easterly Sep. 1983 62 p refs Prepared for Midwest Research Inst., Golden, Colo.
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE84-000009; SERI/STR-214-1708) Avail: NTIS HC A04/MF A01

An annual mean wind speed forecasting model for site-specific applications in the Great Lakes region and an annual mean power law exponent model for the region were developed. The models were utilized to characterize county-level wind resources for residential, agricultural, commercial, and industrial market sectors; and normalized values were identified for average diurnal and monthly wind speeds. The analysis was based on the evaluation of wind speed and topographical data for 124 sites in and around the Great Lakes region. The wind speed forecast equations and topographic maps for Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin were used to characterize the wind resource for each of the 524 counties in Region 5. Of the 524 counties, 241 had some areas with wind resources greater than 5 m/s, and only 24 counties had some areas where the average mean wind speed exceeded 6 m/s. At the state level, Minnesota has the highest average wind speeds in the region, while Indiana has the lowest. DOE

N84-13745# Nebraska Univ., Lincoln. Climatology Program.
SATELLITE OBSERVATIONS OF VARIATIONS IN SOUTHERN HEMISPHERE SNOW COVER
Kenneth F. Dewey and Richard Heim, Jr. Jun. 1983 25 p refs
(PB83-252908; NOAA-83082301; NOAA/TR/NESDIS-1) Avail: NTIS HC A02/MF A01 CSCL 04B

Northern Hemisphere snow cover is currently digitized on an operational basis. Therefore, a research effort was initiated to investigate the extent and variation in Southern Hemsiphere snow cover. The synoptic climatology of Southern Hemisphere snow cover was examined and it was concluded that there should be sufficient amounts of snow to warrant satellite monitoring. Defense Military Satellite Program (DMSP) imagery was analyzed and weekly snow cover maps were generated for the period 1974 through 1980. The snow cover of Australia, New Zealand, and Africa was too infrequent. Therefore, only South American snow cover was digitized and analyzed through the creation of several 7-year snow cover climatologies. Author (GRA)

N84-13746# National Weather Service, Salt Lake City, Utah.
STRATIFIED MAXIMUM TEMPERATURE RELATIONSHIPS BETWEEN SIXTEEN ZONE STATIONS IN ARIZONA AND RESPECTIVE KEY STATIONS
Ira S. Brenner Jun. 1983 25 p refs
(PB83-249904; NOAA-TM-NWS-WR-179; NOAA-83080903) Avail: NTIS HC A02/MF A01 CSCL 04B

The study involved an extensive tabulation of temperature relationships between each of sixteen zone stations in Arizona and respective key stations. Key stations were defined as the five cities in Arizona for which Model Output Statistics temperature forecasts are generated, plus the city of Prescott. Each of these cities was considered to be meteorologically representative of the climatic zone in which it is located. GRA

N84-13747# National Oceanic and Atmospheric Administration, Washington, D. C. National Earth Satellite Service.
SATELLITE ACTIVITIES OF NOAA (NATIONAL ENVIRONMEN-

TAL SATELLITE DATA AND INFORMATION SERVICE) 1982
Jul. 1983 28 p
(PB83-252510; NOAA-83082302) Avail: NTIS HC A03/MF A01 CSCL 04B

Satellite data are used to assess the impact of natural factors and human activities on global food and fuel supplies and on environmental quality. The data also are used to observe and forecast weather conditions, issue warnings of severe weather, and assist community-preparedness programs for weather-related disasters; to prepare charts and coastal maps and for geodetic research; to improve assessment and conservation of marine life; to meet the needs of public and private users including scientists; and for research to improve the nation's environmental service.
Author (GRA)

N84-13748# National Oceanic and Atmospheric Administration, Washington, D. C. National Environmental Satellite, Data, and Information Service.
ECONOMIC BENEFITS OF OPERATIONAL ENVIRONMENTAL SATELLITES
W. John Hussey Mar. 1983 45 p
(PB83-252932; NOAA-83082409) Avail: NTIS HC A03/MF A01 CSCL 04B

Satellite observations of the atmosphere on a global scale began 23 years ago. In the intervening period, satellite sensors and operational techniques for the use of the data have evolved to a high degree of proficiency. This paper identifies and attempts to quantify, to the extent possible, many of the current benefits and uses being derived from the United States Operational Environmental Satellite System. The benefits discussed herein are evidence that the operational environmental satellite has earned its place as an irreplaceable weather and ocean observing tool.
Author (GRA)

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N84-13749# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Remote Sensing Branch.
A POSITION PAPER: MESOSCALE OCEANOGRAPHY FROM GEOSAT Final Report
Jim L. Mitchell Aug. 1983 28 p
(AD-A132292; NORDA-TN-226) Avail: NTIS HC A03/MF A01 CSCL 08/10

The secondary mission of GEOSAT is oceanography. Several Navy elements, (OP-952, OP-02, and ONR) have a direct interest in seeing that every possible attempt is made to maximize the return of information on the oceanic mesoscale from GEOSAT derived sea surface topography. During the nominal, essentially geodetic, GEOSAT mission attempts to obtain meaningful mesoscale information will be severely hampered due to two critical considerations: (1) The non-repeating nature of the satellite groundtracks during its nominal mission will allow for recovery of geoid uncontamination mesoscale topography in only a very few isolated regions with little mesoscale information in over 99% of the global oceans and; (2) The severe temporal undersampling of the oceanic mesoscale will not allow for the desired synoptic realization of non-stationary mesoscale fields. The best way of meeting requirements for GEOSAT's secondary mission is to remaneuver the satellite into an appropriate orbit with exactly repeating ground-tracks at the completion of its nominal, geodetic mission. It is likely (at above the 50% level of probability) that GEOSAT will survive an additional two years beyond completion of its nominal mission. Studies have already been performed to assess the technical feasibility of such an extended, exact repeat mission (the GEOSAT-ERM), and no major technical difficulties are foreseeable. At a cost of roughly $2M annually the GEOSAT-ERM represents the Navy's most cost effective possibility for obtaining critical global mesoscale information. Author (GRA)

N84-13750# Naval Postgraduate School, Monterey, Calif.
BAROCLINIC ROSSBY WAVE SIGNATURE IN A GENERAL CIRCULATION OCEAN MODEL M.S. Thesis
Arno H. Rutsch Jun. 1983 71 p
(AD-A132219; AD-E401062) Avail: NTIS HC A04/MF A01 CSCL 08/10

Monthly mean values of temperature output of a ten-year period (1969-78) from a three-dimensional primitive equation ocean model are used to compute isotherm displacements at eight selected grid points in the North Pacific Ocean. The ocean model input parameters are climatological radiation, clouds, surface air temperature, surface humidity and six-hourly synoptic winds taken from Fleet Numerical Oceanography Center analyses. The first five baroclinic modes are computed from the mean temperature profiles at the eight selected model grid points and these modes are then fit in the time domain to the isotherm displacements. The fit shows evidence of baroclinic free Rossby waves in the time domain at the selected grid points south of 40N and indicates the predominance of the first baroclinic mode. At the selected grid points north of 40N, the results are inconclusive. This is due to the longer periods required at the northern latitudes, the neglect of salinity, and masking by a strong seasonal signal caused by surface heating and cooling at higher latitudes. Author (GRA)

N84-13751# Naval Postgraduate School, Monterey, Calif.
OCEAN MIXING AND CIRCULATION RESPONSE IN THE MARGINAL ICE ZONE M.S. Thesis
David Gregory Markham Jun. 1983 94 p
(AD-A132174; AD-E850405) Avail: NTIS HC A05/MF A01 CSCL 08/3

A sea ice model using the Rossby-similarity method was added to a two-dimensional, embedded ocean general circulation--mixed layer model. Advection, diffusion, and mixing of buoyancy and momentum were included in the model to determine their effects on the ocean response. In particular, the case of Northern Hemisphere ice edge upwelling was investigated. Ice edge upwelling was created for a down-ice geostrophic wind and varying surface buoyancy flux forcing. It appeared in model solutions for both stationary and moving ice covers and is driven by a divergence in the ocean surface transport across the ice edge. These results are supported by the observations of the NORSEX group in the Greenland Sea MIZ (Johannessen et al, 1983). For an up-ice geostrophic wind, the upper ocean response was modified by the buoyancy forcing and ice motion. The combined effects of the wind forcing and ice motion due to a nonstationary ice cover caused weak downwelling at the ice edge. Application of a downward surface buoyancy flux (simulating ice melting) resulted in a 8 m elevation of the mixed layer depth at the ice edge, or upwelling, next to the downwelling. The existence of this dual (upwelling and downwelling) feature at the ice edge differs from the weak downwelling predicted by Roed and O'Brien (1983). Adding the effects of mixing had a significant impact on the upper ocean response and should be incorporated in future models of dynamical MIZ processes. GRA

N84-13752# Battelle Pacific Northwest Lab., Sequim, Wash. Marine Research Lab.
FATE AND EFFECTS OF METALS IN THE SEA-SURFACE MICROLAYER
John T. Hardy and Charles W. Apts May 1983 5 p refs Presented at the CEP Intern. Conf. on Heavy Metals in the Environment, Heidelberg, 6-9 Sep. 1983
(Contract DE-AC06-76RL-01830)
(DE84-000114; PNL-SA-11141; CONF-830918-4) Avail: NTIS HC A02/MF A01

Although significant portions of the metals from atmospheric particulate matter (APM) dissolve in seawater, the long residence times of metals in the sea-surface microlayer (upper 50 (SIGMA)m) lead to high microlayer metals concentrations compared to the subsurface water. APM at realistic deposition levels is not toxic to neustonic flatfish eggs, but ionic metals at the same concentrations as those found in the deposited APM inhibit egg hatching and larval survival. APM deposition rates between 2 and 7 mg/m (2)/hr

negatively impact photosynthesis of phytoneuston, but not phytoplankton. DOE

N84-13753# National Oceanic and Atmospheric Administration, Seattle, Wash.
WINTER CURRENTS ON THE EASTERN BERING SEA SHELF
Sigrid A. Salo, James D. Schumacher, and Lawrence K. Coachman Apr. 1983 61 p refs
(PB83-248823; NOAA-TM-ERL-PMEL-45; CONTRIB-605; NOAA-83081105) Avail: NTIS HC A04/MF A01 CSCL 08C

An analysis of fifteen current records from thirteen locations over the central and northern Bering Sea shelf is presented. Four moorings were deployed over the 196/77 and 1977/78 winters and five over winter 1980/81. Comparison of current and kinetic energy characteristics showed a difference between records from north and south of St. Lawrence Island. To the north, circulation was dominated by northward mean flow (4-15cm/s), and tides accounted for only 24+or-13% of the total kinetic energy of fluctuations. In contrast, mean currents south of St. Lawrence Island exhibited grater variation in direction, were generally 1 to 4cm/s in magnitude and tides accounted for about 55 + or - 31% of the fluctuating kinetic energy. The presence of ice appears to affect the flow by reducing the impact of direct wind stress as driving force. Author (GRA)

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N84-13754 New Mexico Univ., Albuquerque.
THE EFFECTS OF HYPERBARIC ELEMENTAL GASES ON THE RATE COEFFICIENT OF K(+) INFLUX IN MAMMALIAN SYNAPTOSOMES Ph.D. Thesis
Elizabeth Isabel Seibel-Ross 1982 265 p
Avail: Univ. Microfilms Order No. DA8314001

Normal functions of the mammalian CNS are modified by exposure to both high pressure and hyperbaric pressures of narcotic elemental gases, creating a high pressure nervous syndrome and elemental gas narcosis, respectively. The hypothesis that these phenomena are caused by modification of synaptic membrane-mediated changes in ionic transport within the CNS is examined. To test this hypothesis, in vitro preparations of presynaptic nerve enging are employed. A separative procedure is developed here with rapidly and reproducibly separates synaptosomes from their suspending buffer by microcentrifugation enabling a preparation to be collected whose integrity of structure and function is retained. Because this separative method efficiently removes extraneous butter from synaptosomal samples, a kinetic analysis of K-42 influx across the presynaptic membrane can be applied to this model. Dissert. Abstr.

N84-13755 Brigham Young Univ., Provo, Utah.
ADAPTATIONS TO A HIGH FAT DIET WHICH INCREASE EXERCISE ENDURANCE IN MALE RATS Ph.D. Thesis
Wayne C. Miller 1983 62 p
Avail: Univ. Microfilms Order No. DA8313055

Eighty-seven, male Sprague-Dawley rats were randomly assigned to one of two experimental groups. Group 1 consumed a diet high in fat and low in carbohydrate (LCD) while Group 2 ate a normal diet. After either 1 or 5 weeks on the diets, rats from each group were sacrificed either before or after an exhausting run on a rodent treadmill. The LCD animals ran longer before exhaustion at both week 1 and week 5. Adaptations to the LCD included lower muscle and liver glycogen content, decreased rate of carbohydrate utilization during exercise, decreased lactate production, and elevated blood ketone levels. In addition, the LCD caused increased muscular activities of 3-hydroxyacyl CoA dehydrogenase and citrate synthase. Rats exposed to a high fat diet are capable of prolonged intense exercise in spite of limited glycogen stores. This improved capacity for exercise appears to be due, in part, to a decreased rate of carbohydrate metabolism and an increased ability to oxidize fat. Dissert. Abstr.

N84-13756*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
COIL PLANET CENTRIFUGATION AS A MEANS FOR SMALL PARTICLE SEPARATION
Frederick T. Herrmann Nov. 1983 18 p refs
(NASA-TM-82561; NAS 1.15:82561) Avail: NTIS HC A02/MF A01 CSCL 06B

The coil planet centrifuge uses a centrifugal force field to provide separation of particles based on differences in sedimentation rates by flow through a rotating coiled tube. Three main separations are considered: (1) single phase fresh sheep and human erythrocytes, (2) single phase fixed heep and human erythrocytes, and (3) electrophoretically enhanced single phase fresh sheep and human erythrocytes. Author

N84-13757# Scripps Institution of Oceanography, San Diego, Calif.
YIELDS PHOTOSYNTHETIC EFFICIENCIES, AND PROXIMATE CHEMICAL COMPOSITION OF DENSE CULTURES OF MARINE MICROALGAE, A SUBCONTRACT REPORT
W. H. Thomas, D. L. R. Seibert, M. Alden, P. Eldridge, and A. Neori Jul. 1983 63 p refs Prepared for Midwest Research Inst., Golden, Colo.
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-011992; SERI/STR-231-1896) Avail: NTIS HC A04/MF A01

The yields, photosynthetic efficiencies, and proximate composition of several microalgae were compared in dense cultures grown at light intensities up to 70% sunlight. Yields ranged from 3.4 to 21.7 g dry weight/m(2) day. The highest yield was obtained with Phaeodactylum; the lowest in Botryococcus cultures. The same species had the highest and lowest efficiencies of utilization of photosynthetically active radiation. In nitrogen-sufficient cells of all but one species, most of the dry weight consisted of protein. Lipid content of all species was 20 to 29%, and carbohydrate content 11 to 23%. Lipid content increased somewhat in N-deficient Phaeodactylum and Isochrysis cells, but decreased in deficient Monallanthus cells. Because the overall dry weight yield was reduced by deficiency, lipid yields did not increase. However, since the carbonhydrate content increased to about 65% in N-deficient Dunaliella and Tetraselmis cells, the carbohydrate yield increased. In .Phaeodactylum the optimum light intensity was about 40% of full sunlight. Most experiments with this algae included a CUSO4 filter to decrease infrared irradiance. DOE

N84-13758# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
ANALYSIS AND MODELING OF PHOTOSYNTHETIC BACTERIAL HYDROGEN PRODUCTION PLANTS
Ann Herlevich May 1983 11 p refs Presented at the Photo/Biol. Hydrogen Ann. Rev. Meeting, Golden, Colo., 20 May 1983
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE84-000003; SERI/TP-235-1987; CONF-8305137-1) Avail: NTIS HC A02/MF A01

The design of the bacterial reactor can be studied parametrically with the aid of a computer model. This approach is more cost-effective than actually designing and building several reactor configurations. Various geometries can be modeled and their thermal and biological performance determined. The activity should be followed by actual outdoor construction and testing. The thermal performance of the reactor was modeled first, followed by the biological performance. Both have been implemented in a computer program called SOLBUG. SOLBUG accepts hourly solar insolation, wind, and ambient temperature data and calculates the reactor temperature response and hydrogen production. Our materials analysis consisted of incorporating into the earlier study new performance and cost data made available for candidate materials. The overall effect on system performance and cost was determined for two materials (Tedlar and Kynar). Parameters of interest were hydrogen permeability rates, solar transmittance, material lifetime, and cost. System economics using these materials

were compared with previously obtained system cost estimates. DOE

N84-13759# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
NUCLEAR-MEDICINE Quarterly Progress Report
F. F. Knapp, Jr., K. R. Ambrose, T. A. Butler, M. M. Goodman, and P. C. Srivastava Oct. 1983 21 p refs
(Contract W-7405-eng-26)
(DE84-000346; ORNL/TM-8827) Avail: NTIS HC A02/MF A01

Several recently developed (123) -I-labeled fatty acids are described. Well defined planar images were obtained in a dog study utilizing (E) - 18-[(123)I]iodo-17-octadecenoic acid, a new alkenoic fatty acid containing the radioiodide stabilized as a vinyl iodide. The first single photon tomographic images were obtained with 15-[(123)I]iodophenyl-3-(R,S)-methylpentadecanoic acid. This agent was readily obtained from a new kit involving the H(123)I decomposition of the piperidinyl triazene derivative of 15-(p-aminophenyl)-3-(R,S)-methyl-pentadecanoic acid. This agent and several radioiodinated fatty acids in the in vitro beating rat heart cell system is described. The recent evaluation of radioiodinated phosphoinium cations is extended to the preparation and testing of (E)-(-1-[(125)I]iodo-1-penten-5-yl)triphenylarsonium iodide. Several radiolabeled fatty acids including 15-(p-[(131)I]iodopheny-1-3-(R,S)-methylpentadecanoic acid and 15-[(131)I]-iodophenyl)-6-tellurapentadecanoic acid were made to investigate the properties of these new agents. DOE

N84-13760# Brookhaven National Lab., Upton, N. Y.
KINETIC AND SPECTROSCOPIC STUDIES OF CYTOCHROME b-563 IN ISOLATED CYTOCHROME b/f COMPLEX AND IN THYLAKOID MEMBRANES
Geoffrey Hind, Robert D. Clark, and Jeffrey P. Houchins 1983 9 p refs Presented at the 6th Intern. Congr. on Photosynthesis, Brussels, 1-6 Aug. 1983
(Contract DE-AC02-76CH-00016)
(DE83-017982; BNL-33553; CONF-8308110-4) Avail: NTIS HC A02/MF A01

Extensive studies show that a cytochrome (cyt) b/f complex isolated from photosynthetic membranes of spinach or Anabaena catalyzes electron transport from plastoquinol (PQH2) to plastocyanin or algal cyt c-552. The complex from spinach thylakoids generates a membrane potential when reconstituted into liposomes, and although the electrogenic mechanism remains unknown, a key role for cyt b-563 is widely accepted. Electrogenesis by a Q-cycle mechanism requires a plastoquinone (PQ) reductase to be associated with the stromal side of the thylakoid b/f complx though this activity has yet to be demonstrated. It seemed possible that more gentle isolation of the complex might yield a form containing additional polypeptides, perhaps including a PQ reductase or a component involved in returning electrons from reduced ferrodoxin to the complex in cyclic electron flow. Optimization of the isolation of cyt b/f complex for Hybrid 424 spinach from a growth room was also required. DOE

N84-13761# Michigan State Univ., Hickory Corners.
DISSOLVED ORGANIC MATTER AND LAKE METABOLISM: BIOCHEMISTRY AND CONTROLS OF NUTRIENT FLUX DYNAMICS IN LAKES Technical Progress Report, 1 Aug. 1982 - 31 Aug. 1983
Robert G. Wetzel 1983 55 p refs
(Contracts DE-AC02-76EV-01599; EY-76-S-02-1599)
(DE83-016789; DOE/EV-01599/235-Pt-1; COO-1599-235-Pt-1) Avail: NTIS HC A04/MF A01

The interrelated couplings between nutrient loadings from littoral and sediment sources to the open water, and how these fluxes are regulated by the population dynamics of growth, metabolism, senescence, and decomposition of attached littoral and wetland plants (submersed and emergent microphytes; epiphytic and epipelic microflora) and the phytoplankton (algae and bacteria) were analyzed. All of the subprograms are coupled to each other and address the general question of quantifying the regulatory capacities of attached macrophytes and microflora for nutrient loadings and recycling, and how these controls affect phytoplanktonic productivity, competition, and succession. The research progressed in three major areas: wetland nutrient fluxes, littoral controls of internal nutrient loadings from sediment sources, and pelagial nutrient turnover and cycling rates. DOE

N84-13762# Pacific Northwest Lab., Richland, Wash.
USE OF FAUNA AS BIOMONITORS
D. W. Carlile and R. E. Fitzner Aug. 1983 7 p refs Presented at the Renewable Resource Inventories for Monitoring Changes and Trends Conf., Corvallis, Oreg., 15-19 Aug. 1983
(Contract DE-AC06-76RL-01830)
(DE83-016082; PNL-SA-10954; CONF-830872-2) Avail: NTIS HC A02/MF A01

Five criteria by which to evaluate the suitability of faunal species as biomonitors are proffered. The criteria which should be considered include: species response to environmental condition, distribution of species, cost of biomonitoring, precision of measurements and ease of maintaining a monitoring system. As an example, the criteria are used in assessing the utility of using nesting Great Blue Herons as biomonitors of fate and effects of environmental contaminants. Emphasis is placed on a method of determining optimal sampling based on cost and precision of measurements of environmental condition. Heron excreta, collected from nine colonies throughout the arid, Mid-Columbia region of Washington, was analyzed to determine levels of specific pollutants. Analyses of variance components were conducted and estimates of within and among-colony variance in levels of selected pollutants are provided. From such variance estimates, numbers of colonies and samples within colonies needed to obtain precise estimates of pollutant levels are determined. The costs of each aspect of sampling are accounted for and are incorporated into a cost function to estimate the cost of sampling. Costs associated specifically with colonies and those attributed to samples within colonies are related to estimates of among and within-colony variation in pollutant levels. This enables determination of the most cost-effective allocation of sampling effort. This method of associating precision and cost is also applied to counts of fledglings for assessment of effects. DOE

N84-13763# Pacific Northwest Lab., Richland, Wash.
LIFE HISTORIES AND MONITORING STRATEGIES: SOME LESSONS FROM FIELD EXPERIENCE
W. Ted Hinds Aug. 1983 20 p Presented at the Intern. Conf. on Renewable Resource Inventories to Monitor Change and Trend, Corvallis, Oreg., 15-19 Aug. 1983
(Contract DE-AC06-76RL-01830)
(DE83-016164; PNL-SA-11013; CONF-830872-3) Avail: NTIS HC A02/MF A01

Appropriately selected ecological measurements can provide economical and accurate data for long-term measurements. Two considerations are initially important: specific methods reflecting activities in the life history of target biota, and specification of the statistical population for which inferences can be made. We have found that working with common species and focusing on aggregated or colonial aspects of life histories is nearly essential for cost-effective data. Examples from forests and food webs in Washington suggest that long-term studies will benefit from passive methods. Specification or definition of the population of interest is necessary to determine where the measurements must be made. Unfortunately, ambiguities in identifying replicates are common. Some method of locating a population of equally suitable sites from which replicates can be selected properly is needed. A procedure for selecting a suite of equally suitable sites using cluster and discriminant analyses is suggested, and illustrated to demonstrate the problems and potentials involved. DOE

N84-13764# Oak Ridge National Lab., Tenn.
CHEMICAL AND PHYSICAL CHARACTERIZATION OF THE ACTIVATION OF RIBULOSEBIPHOSPHATE CARBOXYLASE/OXYGENASE
Mark I. Donnelly, V. Ramakrishnan, and Fred C. Hartman 1983 5 p refs Presented at the 6th Intern. Congr. on Photosynthesis,

Brussels, 1 Aug. 1983
(Contract W-7405-eng-26)
(DE83-017226; CONF-8308110-5) Avail: NTIS HC A02/MF A01

Molecular structure of ribulosebiophosphate carboxylase/oxygenase isolated from Rhodospirillium was compared with the enzyme isolated from Alcaligens eutrophus. Peptides derived from the active center of the bacterial enzyme were highly homologous with those isolated from spinach. Molecular shapes of the carboxylases were estimated using neutron scattering data. These studies suggested that the enzyme as isolated from R. rubrum is a solid prolate ellipsoid or cylinder, while the spinach enzyme resembles a hollow sphere. DOE

N84-13765# Texas Univ., Austin. Lab. of Radiation Biology.
EARLY MECHANISMS IN RADIATION-INDUCED BIOLOGICAL DAMAGE
E. L. Powers 1983 9 p Presented at the 7th Intern. Conf. of Radiation Res., Amsterdam, 3-8 Jul. 1983
(Contract DE-AS05-76EV-03408; Grants NIH-GM-13557; NIH-RR-00886)
(DE84-001511; CONF-830710-10) Avail: NTIS HC A02/MF A01

An introduction to the mechanisms of radiation action in biological systems is presented. Several questions about the nature of the radiation damage process are discussed, including recognition of the oxygen effects, dose response relationships, and the importance of the hydroxyl radical. DOE

N84-13766# California Univ., Santa Cruz. Dept. of Biology.
RESPIRATION OF ROOTS RESPONSE TO LOW O2 STRESS Final Report
Harry Beevers 1983 4 p
(Contracts DE-AT03-76ER-70185; DE-AM03-76SF-00034)
(DE83-017495; DOE/ER-71085/T2) Avail: NTIS HC A02/MF A01

Progress is reported in the following research areas: effects of O2 concentration on rice seedlings; alcohol dehydrogenase and an inactivator from rice seedlings; and properties and intracellular location of alcohol dehydrogenase from rice seedlings. DOE

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N84-13767*# National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 251)
Nov. 1983 95 p
(NASA-SP-7011(251); NAS 1.21:7011(251)) Avail: NTIS HC A05/MF A01 CSCL 06E

This bibliography lists 322 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1983 Author

N84-13768 Pennsylvania State Univ., University Park.
PHYSIOLOGICAL RESPONSES OF NORMOTENSIVES AND ESSENTIAL HYPERTENSIVES TO EXERCISE IN THE HEAT Ph.D. Thesis
William Lawrence Kenney, Jr. 1983 128 p
Avail: Univ. Microfilms Order No. DA8312640

Six essential hypertensives (mean resting arterial pressure = 149/97 mm Hg) and eight normotensive controls (mean resting arterial pressure = 115/73 mm Hg) were tested during one hour of dynamic leg exercise in the heat. Environmental conditions were set at a dry bulb temperature of 38 C and a wet bulb temperature of 28 C; exercise intensity was preset to approximate 40% of each individual's maximal aerobic capacity. During exercise in the heat, the difference in arterial blood pressure between the two groups was maintained. No difference in heat strain (as measured by core temperature and heart rate responses) was noted. Stroke volumes and cardiac outputs of the hypertensive group were significantly lower than those of the control group during the exercise session. The elevated blood pressure of the hypertensives was maintained by an elevated total peripheral resistance, both at rest and during exercise in the heat. Dissert. Abstr.

N84-13769 Ohio State Univ., Columbus.
AN EXPERIMENTAL STUDY OF MULTI-LINK MODELS OF HUMAN POSTURAL DYNAMICS AND CONTROL Ph.D. Thesis
Kamran Barin 1983 527 p
Avail: Univ. Microfilms Order No. DA8311724

The human postural control system is a multi-input, hierarchical, and adaptive system with over 200 degrees of freedom. The goal of this investigation was to develop a model of the human postural system that is realistic, yet simple enough to permit analytical study of the control scheme. This system is viewed as having two major components: (1) a 'plant', consisting of the musculoskeletal system, and (2) feedback system, consisting of the sensory modalities and central processor. The dynamics of the plant in the sagittal plane can be viewed as a multi-link inverted pendulum. A general formulation of the inverse dynamics for an N-link planar mechanism was obtained by employing Newton-Euler principles. Using this formulation, an evaluation procedure for N-link planar models was developed based on measurement of the center of pressure. To model the feedback system, a simple feedback control law was postulated in which the torque acting at a given segment is a linear combination of the state variables--the segment angles and angular velocities. Dissert. Abstr.

N84-13770# Bowling Green State Univ., Ohio. Dept. of Psychology.
DECISION MAKING AND INFORMATION PROCESSING UNDER VARIOUS UNCERTAINTY CONDITIONS Final Report
Lowell M. Schipper and Michael Doherty Brooks AFB, Tex. AFHRL Aug. 1983 55 p
(Contract F33615-81-K-0014; AF Proj. 2313)
(AD-A132051; AFHRL-TR-83-19) Avail: NTIS HC A04/MF A01 CSCL 05/10

Seven experiments were conducted in the area of decision making and information processing under conditions of uncertainty. Several different experimental tasks were used, all of which presented the subject with multiple independent sources of information regarding the likelihood that some event would occur. The input was a probabilistic estimate, and the problems had no correct answers. Study I used Air Force pilots as subjects. All other studies used undergraduate college students. The independent variables included the number of inputs, the reliability of the inputs, the effects of discrepant (i.e., outlying) inputs, the format of the problem, and the time available to respond. All tasks and subsequent analyses were non-Bayesian, yielding both normative and idiographic information. The subject's varied somewhat with each study but basically was to indicate which event was most likely to occur or to make an estimate of the likelihood of a given event. The results of these studies indicated no significant differences between F-16 pilots and student pilots in their use of averaging as the predominant strategy chosen. The effects of unreliable feedback were studied in an information seeking diagnostic task. The results indicated that when the post decision feedback was unreliable, the consistency of subsequent decision-making patterns was disrupted. The effects of information reliability were equivocal in that sometimes unreliable information was incorporated into the decision making processes in predictable patterns, and in other instances, the information labelled as unreliable was simply ignored. GRA

N84-13771# School of Aerospace Medicine, Brooks AFB, Tex.
DECOMPRESSION PROCEDURES FOR FLYING AFTER DIVING, AND DIVING AT ALTITUDES ABOVE SEA LEVEL Final Report, May 1979 - Jun. 1982
Bruce E. Bassett Dec. 1982 43 p
(AF Proj. 7930)
(AD-A132039; SAM-TR-82-47) Avail: NTIS HC A03/MF A01 CSCL 06/19

Decompression procedures were developed for divers exposed

to reduced atmospheric pressures shortly after diving. These procedures involved human subjects and multiple diving exposures in laboratory hyperbaric and altitude chambers. The studies were conducted in two phases. In Phase I, six exposure schedules were tested using 16 - 20 subjects per exposure. The six exposures tested--dive depth in feet sea water/no-decompression limit (minutes) for direct ascent to 10,000 ft--were: 130/7; 100/10; 80/14; 60/20; 40/34; and 10.75/1440. Exercise was performed at depth. Subjects remained at 10,000 ft for 4 hr, during which they exercised and breathed ambient chamber air. Then the subjects went to 16,000 ft for 1 hr, and used a diluter-demand oxygen system. Subjects were monitored for venous gas emboli (vge) by means of a precordial Doppler ultrasonic bubble detector. At 10,000 ft: 11.8% of the exposures produced vge, and 6.4% of exposures were terminated because of bends or high vge scores. At 16,000 ft: 4.9% of the 103 exposures ended with bends or vge. Phase II used three exposures--100/10, 80/14, and 60/20 schedules--and altitude exposures were changed from 10,000 to 8,500 ft, and from 16,000 to 14,250 ft. Of the 57 subject exposures in Phase II, none developed bends or high vge scores at 8,500 ft. At 14,250 ft, 5.3% developed bends or high vge scores. GRA

N84-13772# Desmatics, Inc., State College, Pa.
MOTION SICKNESS INCIDENCE: DISTRIBUTION OF TIME TO FIRST EMESIS AND COMPARISON OF SOME COMPLEX MOTION CONDITIONS
Kevin C. Burns Aug. 1983 4035 p
(Contract N00014-79-C-0128)
(AD-A131930; TR-112-15) Avail: NTIS HC A03/MF A01 CSCL 06/19

A statistical mixture model is used to fit time-to-emesis data. The Weibull probability distribution is shown to provide a good fit for those subjects who either become sick or withdraw from the experiment within two hours. The second part of the mixture accounts for those subjects who neither quit nor vomit within two hours. The lognormal probability model is shown to give a poorer fit to the data and figures showing the relative fits of the estimated Weibull and lognormal distributions are provided. A nonparametric test is used to compare the five motion conditions of the Correlation Study. That test shows that there are significance differences in severity among the conditions. Author (GRA)

N84-13773# Technology, Inc., San Antonio, Tex. Life Sciences Div.
STRESS ASSESSMENT THROUGH VOICE ANALYSIS Final Report
N. C. Chambers, J. C. Brakefield, D. I. Yahiel, and D. D. Fulgham Brooks AFB, Tex. AFHRL Sep. 1983 47 p
(Contract F33615-80-C-0018; AF Proj. 7719)
(AD-A132577; AFHRL-TP-83-47) Avail: NTIS HC A03/MF A01 CSCL 17/2

An attempt was made to assess emotional stress through voice analysis. The involuntary vocal musculature microtremor, which has been reported in some literature as correlated with stress, was chosen as the variable for analysis. An autocorrelation technique was developed using a CD&A array processor installed in a DEC PDP 11/34 computer. Although the technique isolated frequency modulation (FM), the microtremor was not identified, primarily due to excessive noise in the 5-15 Hz frequency band of interest. Author (GRA)

N84-13774# Arizona Univ., Tucson. Div. of Respiratory Sciences.
RESPIRATORY EFFECTS ON POPULATION FROM LOW-LEVEL EXPOSURES TO OZONE
Michael D. Lebowitz, C. J. Holberg, and R. R. Dodge 1983 12 p refs
(Grants EPA-R-805318; N01-HL-1-4136)
(PB83-246132; EPA-600/D-83-108) Avail: NTIS HC A02/MF A01 CSCL 06T

A symptom stratified, geographic cluster sample of 117 middleclass households (211 subjects) was studied in Tucson, AZ. Daily symptom diaries and peak flows were obtained. Included were 24 white children age 5 to 25 (middleclass) with total person days of 1512 and adults by chronic symptom group. GRA

N84-13775# Health Effects Research Lab., Research Triangle Park, N. C. Neurotoxicology Div.
EVENT-RELATED BRAIN POTENTIALS: AN ALTERNATIVE METHODOLOGY FOR NEUROTOXICOLOGICAL RESEARCH
David A. Otto Aug. 1983 18 p refs Presented at the Symp. on Neuropsychological Effects of Solvents, London, Apr. 1982
(PB83-246116; EPA-600/D-83-105) Avail: NTIS HC A02/MF A01 CSCL 06T

One of the problems encountered in studies of glue sniffing, and other types of solvent poisoning is addiction. This problem also afflicts researchers who tend to become addicted to a particular methodology. Some alternatives to the behavioral methods to which many of us have become addicted are reviewed. These alternatives include sensory evoked potentials and event-related slow potentials of the brain. Evoked potentials are sensitive, clinically proven, indices of sensory deficts, while event-related slow potentials are sensitive, albeit experimental, indices of cognitive dysfunction. Evidence is accumulating that evoked and slow potential measures may also be sensitive indices of neutrotoxic effect. Author (GRA)

N84-13374# National Bureau of Standards, Washington, D.C.
STUDY OF BIOLOGICAL SAMPLES OBTAINED FROM VICTIMS OF MGM GRAND HOTEL FIRE
M. Birky, D. Malek, D. Mayne, and M. Paabo *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 622-652 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

N84-13375# Building Research Inst., Tokyo (Japan).
US-JAPAN COOPERATIVE RESEARCH ON EVALUATION OF TOXICITY
Shuitsu Yusa, Fumiharu Saito, and Masashi Yoshida *In its* Proc. of the 6th Joint Panel Meeting 1982 p 655-663 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

N84-13376# Yokohama Municipal Univ. (Japan). Dept. of Legal Medicine.
PHYSIOLOGICAL FUNCTION OF COMBUSTION GAS AND ESPECIALLY THAT OF CN
Yoichi Nishimaru and Yukio Tsuda *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 664-669 (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N84-13776# National Inst. for Personnel Research, Johannesburg (South Africa).
THE PROGRAMMING AND VALIDATION OF THE COMPUTERISED VERSION OF THE INTERMEDIATE MENTAL ALERTNESS TEST
T. R. Taylor, M. Werbeloff, and M. R. Ebertsohn Jul. 1982 81 p refs
(CSIR-PERS-303; CSIR-PERS-339; ISBN-0-7988-2325-9) Avail: NTIS HC A05/MF A01

The programming of the Intermediate Mental Alertness Test (IMA) on the PLATO systems, the validation of the computerized IMA, and the computerization of the manual for the tests are covered. N.W.

N84-13777# National Inst. for Personnel Research, Johannesburg (South Africa). Management Studies Div.
WOMEN AT WORK AND STRESS

J. vanRooyen Sep. 1982 10 p Presented at the Occupational Health Seminar, Johannesburg, 1982
(R/PERS-626) Avail: NTIS HC A02/MF A01

The implications which occupational involvement and the stress of meeting multiple role demands may have on women's health and quality of life experiences are discussed. Stress and stress patterns are analyzed. The coping strategies use by females are also discussed. S.L.

N84-13778# Stanford Univ., Calif. Dept. of Psychology.
EXTERNAL VERSUS INTUITIVE REASONING: THE CONJUNCTION FALLACY IN PROBABILITY JUDGMENT
Amos Tversky and Daniel Kahneman Jun. 1983 71 p
(Contract N00014-79-C-0077)
(AD-A131801) Avail: NTIS HC A04/MF A01 CSCL 05/10

Perhaps the simplest and the most basic qualitative law of probability is the conjunction rule: the probability of a conjunction P (A&B) cannot exceed the probabilities of its constituents, P(A) and P(B), because the extension (or the possibility set) of the conjunction is included in the extension of its constituents. Judgments under uncertainty, however, are often mediated by intuitive heuristics that are not bound by the conjunction rule. A conjunction can be more representative than one of its constituents and instances of a specific category can be easier to imagine or retrieve than instances of a more inclusive category. The representativeness and availability heuristics therefore can make a conjunction appear more probable than one of its constituents. This phenomenon is demonstrated in a variety of contexts including estimation of word frequency, personality judgment, medical prognosis, decision under risk, suspicion of criminal acts and political forecasting. Systematic violations of the conjunction rule are observed in judgments of lay people and of experts in both between-subjects and within-subjects comparisons. GRA

N84-13779# Rice Univ., Houston, Tex.
COGNITIVE COMPONENTS UNDERLYING THE DIGIT SYMBOL TEST
David M. Lane Nov. 1982 16 p
(Grant PHS-MH-36551)
(PB83-250464; NIMH-83-310) Avail: NTIS HC A02/MF A01 CSCL 05J

What the Symbol Digit Test measures in terms of its underlying information processing components and which of these components are most responsible for age and sex differences on the test were studied. It was found that the test measures perceptual speed and abilities in different populations. No explanation was found for why females perform better on the Symbol Digit Test than do males. GRA

N84-13780# Internal Revenue Service, Arlington, Va. Federal Interagency Group for Computer-Based Training.
COMPUTER-BASED TRAINING STARTER KIT
May 1983 92 p refs
(PB83-248815; FIGCBT/DOC-1; Document-6846) Avail: NTIS HC A05/MF A01 CSCL 05I

The kit describes the process steps necessary for the successful implementation of computer-based training (CBT) programs without falling into the various pitfalls inherent in the new technology. Topics include: needs assessment, feasibility studies, getting approval, system plans and proposals, prototype systems development, courseware development and evaluation and maintenance. Six appendices list references and sources of further information. The kit is being issued as a final draft to solicit comments and suggestions from users for next year's edition. GRA

N84-13351# Kansai Univ., Osaka (Japan).
HUMAN BEHAVIOR Progress Report
Saburo Horiuchi and Tadahisa Jin *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 140-144 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

N84-13352# Maryland Univ., College Park.
HUMAN BEHAVIOR Progress Report
John L. Bryan *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 146-151 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

N84-13358# Maryland Univ., College Park. Dept. of Fire Protection Engineering.
THE MGM GRAND HOTEL FIRE: A CASE STUDY OF HUMAN REACTION TO FIRE
John L. Bryan *In* Building Research Inst. Proc. of the 6th Joint Panel Meeting 1982 p 218-250 refs (For primary document see N84-13341 04-31)
Avail: NTIS HC A99/MF A01

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N84-13781*# Bionetics Corp., Hampton, Va.
TECHNOLOGY EVALUATION OF MAN-RATED ACCELERATION TEST EQUIPMENT FOR VESTIBULAR RESEARCH Final Report
I. Taback, R. L. Kenimer, and A. J. Butterfield Sep. 1983 99 p refs
(Contract NAS1-16978)
(NASA-CR-172160; NAS 1.26:172160) Avail: NTIS HC A05/MF A01 CSCL 05H

The considerations for eliminating acceleration noise cues in horizontal, linear, cyclic-motion sleds intended for both ground and shuttle-flight applications are addressed. the principal concerns are the acceleration transients associated with change in direction-of-motion for the carriage. The study presents a design limit for acceleration cues or transients based upon published measurements for thresholds of human perception to linear cyclic motion. The sources and levels for motion transients are presented based upon measurements obtained from existing sled systems. The approaches to a noise-free system recommends the use of air bearings for the carriage support and moving-coil linear induction motors operating at low frequency as the drive system. Metal belts running on air bearing pulleys provide an alternate approach to the driving system. The appendix presents a discussion of alternate testing techniques intended to provide preliminary type data by means of pendulums, linear motion devices and commercial air bearing tables. Author

N84-13782# National Bureau of Standards, Washington, D.C. National Engineering Lab.
SIZE OF LETTERS REQUIRED FOR VISIBILITY AS A FUNCTION OF VIEWING DISTANCE AND OBSERVER VISUAL ACUITY
Gerald L. Howett Jul. 1983 75 p refs Sponsored by OSHA
(PB83-250589; NBS-TN-1180) Avail: NTIS HC A04/MF A01 CSCL 05E

A formula is derived giving the letter stroke-width needed for legibility of words on a sign at any given distance by an observer with any given visual acuity. The stroke width, in turn, determines the letter size, depending upon the characteristics of the type face used. The derivation is strictly mathematical and is based on the assumption that beyond a distance of a few meters, a person's visual acuity is specificable by a fixed visual angle, independent of distance. The information implicit in the formula is also presented graphically, in four plots that apply to four different combinations of length units for measuring stroke width and viewing distance. Also presented are formulas and graphs for correcting the critical stroke width for nonstandard contrast of background luminance. Author (GRA)

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N84-13783 Helsinki Univ. (Finland). Dept. of Mathematics.
THE SPECIFIC SOLUTIONS OF A UNIFORM ALGEBRAIC DIFFERENTIAL EQUATION OF THE SECOND ORDER [ANNALES ACADEMIAE SCIENTIARUM FENNICAE. SERIES A,1: MATHEMATICA, VOLUMEN 7]
Olli Lehto, ed. 1982 382 p refs In ENGLISH and FINNISH (ISSN-0066-1953) Copyright. Avail: Issuing Activity

Several topics in functional analysis, topology and conformal mapping, abstract spaces, and ordinary and partial differential equations are addressed. Some emphasis is given to harmonic and meromorphic functions and Fuchsian groups. For individual titles, see N84-13784 through N84-13804.

N84-13784 Salzburg Univ. (Austria) Dept. of Mathematics.
ON SOME EXTENSIONS OF A THEOREM OF HARDY AND LITTLEWOOD **c64**
H. Stegbuchner *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 113-117 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

The theorem of Hardy and Littlewood is demonstrated to remain valid with the incorporation of a uniform domain and modulus of continuity. The resulting theorem is given as: let G is contained in C be a domain with dG does not = nonzero, omega(t) any modulus of continuity, and f is a member of A sub omega (bar-G). Then for all z element of G with d sub z = dist(z,dG) there is /f'(z)/< or = C dot D(+)omega(d sub z), where C is a constant independent of z. M.G.

N84-13785 Helsinki Univ. (Finland). Dept. of Mathematics.
ON THE GROWTH OF THE SPHERICAL DERIVATIVE OF A MEROMORPHIC FUNCTION **c64**
Sakarai Toppila *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 119-139 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

Let f be meromorphic in the plane. In this paper, estimates are given on the growth of mu (r,f) and lambda (r,f). Theorems are proven using the nevanlinna theory. B.W.

N84-13786 California Univ., Los Angeles. Dept. of Mathematics.
POSITIVE BIHARMONIC FUNCTIONS **c64**
Brad Beaver, Leo Sario, and Cecilia Wang *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 141-146 refs Prepared in cooperation with Arizona State Univ., Tempe (For primary document see N84-13783 04-59)
Avail: Issuing Activity

The existence of QN functions implies that the class H(2)P of positive nonharmonic biharmonic functions is nonvoid. The natural question is and has remained unsolved thus far: do there exist Riemannian manifolds which do not carry H(2)P functions? In the present paper this question is answered in the affirmative for any dimension N>2: the class N-dimensional O sub H(2)P of Riemannian N manifolds which carry no H(2)P functions is nonvoid. It is shown that the inclusion N-dimensional O sub QN is strict by constructing a manifold in the delicately small class of Riemannian N manifolds which carry H(2)P functions but nevertheless do not carry QN functions. B.W.

N84-13787 Purdue Univ., Lafayette, Ind. Dept. of Mathematics.
ON THE SINGULARITIES OF CERTAIN NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS **c64**
Patricio Aviles and Allen Weitsman *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 147-156 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

In this paper some aspects of the singularities of equations are studied - delta sub pU = f(x,u) where delta sub pU = div(/nabla u/(p-2)nabla U)(p > 1) is the so called p-Laplacian, and f a continuous function subject to certain growth restrictions. Equations of this type have been studied in connection with a variety of problems. B.W.

N84-13788 Indian Inst. of Tech., Madras. Dept. of Mathematics.
ON THE FATOU SET OF MONIC POLYNOMIALS **c64**
P. Bhattacharyya and Y. E. Arumaraj *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 157-163 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

The theory of iteration of a rational or entire function of a complex variable z deals with the sequence of natural iterates f(z) defined by f sub o (z) = z,f sub n+1 (z) = f(f sub n (z)), n = 0,1 ... . In the theory developed by Fatou (3,4) and Julia (6), the central object of study is the Fatou Set F(f) of those points of the complex plane in no neighborhood of which the sequence of natural iterates (f sub n (z)) forms a normal family in the sense of Montel. Unless f(z) is a rational function of order 0 or 1, the set F(f) has the following properties, proved for rational functions in (3) and for entire functions in (4). 1. F(f) is a nonempty perfect set. 2. F(f) = F(f) for any integer n > or = 1. 3. F(f) is completely invariant under the mapping z f(z), i.e., if alpha belongs to F(f), then f(alpha) and every solution beta of f(beta) = alpha also belong to F(f). 4. F(f) has no interior points unless it is the whole plane. B.W.

N84-13789 Helsinki Univ. (Finland). Dept. of Mathematics.
ON THE RANGE OF REAL COEFFICIENTS OF FUNCTIONS WITH BOUNDED BOUNDARY ROTATION **c64**
Heikki Haario *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 165-176 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

For k > or = 2 let B sub k denote the class of analytic functions f(z) = z+a sub 2 z(2) + ... which map the unit disc onto a domain whose boundary rotation is at most k pi. It is known that every boundary point of a coefficient body (a sub 2, ..., a sub n) in the class B sub k corresponds to a unique extremal function. The aim of this paper is to find the region of variability of the coefficients a sub 2, a sub 3, a sub 4 in the special case of real coefficients. A suitable coefficient combination with two real parameters is considered. As an application in the real case, the maximum of the fourth inverse coefficient also in the interval is considered z <k < 2 1/3. B.W.

N84-13790 Karlsruhe Univ. (West Germany). Inst. Mathematisches.
THE SPECIFIC SOLUTIONS OF A UNIFORM ALGEBRAIC DIFFERENTIAL EQUATION OF THE SECOND ORDER [UEBER DIE EINDEUTIGEN LOESUNGEN EINER HOMOGENEN ALGEBRAISCHEN DIFFERENTIALGLEICHUNG ZWEITER ORDNUNG] **c64**
Norbert Steinmetz *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 179-188 refs In GERMAN (For primary document see N84-13783 04-59)
Avail: Issuing Activity

The commonality of the finite order in C meromorphic solutions of algebraic differential equations was examined. It is shown that the meromorphic functions are a good supplement in the calculations of differential equations. E.A.K.

N84-13791 Institute for Advanced Study, Princeton, N.J. School of Mathematics.
ON THE STRUCTURE OF SELF-SIMILAR FRACTALS **c64**
Pertti Mattila *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 189-195 refs Prepared in cooperation with Helsinki Univ., Finland (For primary document see N84-13783 04-59)
Avail: Issuing Activity

A proof is given for the following theorem: Suppose that L satisfies the open set condition with the open bounded sets O and U, O contained in U, and that the following separation condition holds: If l is a line in R (n) such that bar - O sub i intersected with l does not equal nonzero does not equal bar - O sub j intersected with l for some i does not equal j, then (U is necessary and sufficient when the union of (n) sub i = 1 bar - O sub i) intersected with l does not equal nonzero. Then there is epsilon > O such that for any m-dimensional C (1), dim (M intersected with K) less than or equal to m-minus epsilon. R.J.F.

N84-13792 Helsinki Univ. (Finland). Dept. of Mathematics.
QUASICONFORMAL SEMIFLOWS **c67**
Jukka Sarvas *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 197-219 refs Prepared in cooperation with Michigan Univ., Ann Arbor (For primary document see N84-13783 04-59)
Avail: Issuing Activity

Quasiconformal semiflows are discussed. The purpose is to enlarge the class of qc semiflows and to make the class more flexible. Operators S sub alpha f = (1/2) (Df + Df) + alpha tr (Df) I, alpha does not equal -1/n, and div f = tr (Df) are studied. The S sub alpha lead to Lipschitz semiflows and the div operator to semiflows theta with a bounded Jacobian determinant J sub theta sub tau. The case of div is interesting because the generating process of the corresponding semiflow can be reversed. R.J.F.

N84-13793 Helsinki Univ. (Finland). Dept. of Mathematics.
ON THE ORDER OF QUASIREGULAR MAPPINGS **c64**
S. Rickman and M. Vuorinen *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 221-231 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

A continuous mapping f:G approaches the limit of R (n) of a domain G in the Euclidean n-space R (n), n greater than or equal to 2, is called quasiregular (qr) if f belongs to the local Soboler space W (1) sub n, loc (G) and for some K, 1 less than or equal to K less than infinity, /f'(x)/(n) less than or equal to KJ sub f (x) a.e. holds. Here /f'(x)/ is the operator norm of the formal derivative f'(x) and J sub f (x) is the Jacobian determinant at x. Quasiregular mappings constitute a class of functions which is a natural generalization of a class of analytic functions in the complex plane. Proofs are given which are based on a two constant theorem for qr mappings, which in turn are based on estimates of solutions to quasilinear partial differential equations. R.J.F.

N84-13794 Helsinki Univ. of Technology, Espoo (Finland). Inst. of Mathematics.
F-HARMONIC MEASURE IN SPACE **c67**
S. Granlund, P. Lindqvist, and O. Martio *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 233-247 refs Prepared in cooperation with Jyvaskyla Univ., Finland (For primary document see N84-13783 04-59)
Avail: Issuing Activity

The use of harmonic measure is well established in the theory of harmonic and analytic functions. A similar concept is presented which is based on a nonlinear Euler equation of the variational integral F(x,nabla u)dm where F(x,h)approximates /h/(n). The form of F is essential for applications in conformal geometry. The purpose is to show that this concept, called the F harmonic measure, is useful even in the nonlinear case in space although it has several drawbacks, e.g., it does not define a measure. R.J.F.

N84-13795 Technische Univ., Berlin (West Germany). Fachbereich Mathematik.
ON FUCHSIAN GROUPS OF ACCESSIBLE TYPE **c67**
Ch. Pommerenke *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 249-258 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

Conditions for determining whether Fuchsian groups are acceptable are discussed. Riemann surfaces are discussed. R.J.F.

N84-13796 Helsinki Univ. (Finland). Dept. of Mathematics.
ON THE HARNACK CONSTANT AND THE BOUNDARY BEHAVIOR OF HARNACK FUNCTIONS **c64**
Matti Vuorinen *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 259-277 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

The boundary behavior of Harnack functions at an individual boundary point is discussed. The main tool used is a sharp upper bound of the Harnack function. It is assumed that a Harnack function of R (n) sub + tends to 0 either through a sequence of points converging to the origin or through a curve terminating at the origin. Several examples are constructed to show that the results established are the best possible and to illuminate various phenomena in the boundary behavior of Harnack functions. R.J.F.

N84-13797 Jyvaskyla Univ. (Finland). Dept. of Mathematics.
ON QUASI-PARABOLIC PROBLEMS WITH NORMAL BOUNDARY CONDITIONS **c64**
Veikko T. Purmonen *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 279-290 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

Initial - boundary value problems involving linear partial differential operators with constant complex coefficients are discussed. The problems considered are quasi-parabolic and their inertial boundary operator system is normal to the hyperplane + sub n = 0. R.J.F.

N84-13798 Helsinki Univ. (Finland). Dept. of Mathematics.
REGULAR n-GONS AND FUCHSIAN GROUPS **c67**
Marjatta Naeaetaenen *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 291-300 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

A. F. Beardon found the greatest lower bound for the radius of a hyperbolic disc inscribed in a hyperbolic triangle of a given area. Here the corresponding upper bound for a convex n-gon P, n>or = 3 is found. The greatest lower bound for the radius of a closed disc containing a convex n-gon P of a given area is also considered. Both are attained when P is regular, i.e., the sides are of equal length and the angles are equal. The results are applied for Fuchsian groups of signature (2,0), and the minimal trace is calculated in the group with the regular octagon with diametrally opposite pairings of sides as a fundamental domain. M.G.

N84-13799 Warsaw Univ. (Poland). Dept. of Mathematics.
ON L SUP p-INTEGRABILITY IN PDE'S AND QUASIREGULAR MAPPINGS FOR LARGE EXPONENTS **c64**
Tadeusz Iwaniec *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 301-322 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

A local version of the lemma of Gehring invented with references to quasiconformal mappings is presented. The adaptation of the lemma to partial differential equations is demonstrated through examples. A local version of the Fefferman and Stein inequality is also developed and the regularity of harmonic functions and generalized conformal maps is discussed. M.G.

N84-13800 Helsinki Univ. (Finland). Dept. of Mathematics.
TWISTED SUMS OF NUCLEAR FRECHET SPACES **c67**
Timo Ketonen and Kaisa Nyberg *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 323-335 refs (For primary

document see N84-13783 04-59)
Avail: Issuing Activity

The investigation of short exact sequences is discussed. Let E and F be nuclear Frechet spaces. The problem is to construct a nontrivial twisted sum of the spaces E and F, i.e., to contruct a space X such that is has a subspace Y isomorphic to E with X/Y isomorphic to F, and such that Y is not complemented in X. It is shown that in the case of nuclear Frechet spaces there is a general method of constructing twisted sums, provided that the quotient space has a basis. Nontrivial examples of short exact sequences of the type 0 approaches lambda sub 1 (alpha) approaches X approaches lambda sub 1 (beta) approaches 0 and 0 approaches lambda sub infinity (alpha) approaches X approaches lambda sub 1 (beta) approaches 0 are constructed. A fairly general splitting condition when both the subspace and the quotient space have bases is given. M.G.

N84-13801 Minnesota Univ., Minneapolis. School of Mathematics.
QUASICONFORMAL MAPPINGS WITH FREE BOUNDARY COMPONENTS c67
Richard Fehlmann *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 337-347 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

Let gamma denote a closed subset of the boundary of D = [w//w/ <1] and T a compact subset of D, such that D - T is a domain. A quasiconformal mapping F, z = F(w), is considered which maps D-T into D, such that dD is mapped onto itself. The class of all such mappings which agree with F on gamma is denoted by O sub F. If F has minimal maximal dilatation in the class Q sub f, F is called absolutely extremal. The notation absolutely extremal is used to indicate that the image domains of competing mappings are not fixed. By normality it is concluded that Q sub F contains at least one absolutely extremal mapping. If there is only one such mapping, it is called uniquely absolutely extremal. The necessary and sufficient conditions for a mapping to be absolutely extremal are derived. M.G.

N84-13802 Tokyo Metropolitan Univ. (Japan). Dept. of Mathematics.
FUNCTIONS OF UNIFORMLY BOUNDED CHARACTERISTIC c64
Shinji Yamashita *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 349-367 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

A notion of functions of uniformly bounded characteristic in the disk in terms of the Shimizu-Ahlfors characteristic function is introduced. Blaschke products and holomorphic functions in the disk are considered. M.G.

N84-13803 Oxford Univ. (England). Mathematical Inst.
CONVOLUTION OF GENERALIZED VECTOR MEASURES c64
Olli Martikainen *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 369-382 refs Prepared in cooperation with Helsinki Univ. of Tech., Espoo, Finland (For primary document see N84-13783 04-59)
Avail: Issuing Activity

Weakly compact operators from C-algebras into Banach spaces are called generalized vector measures. Their convolution is constructed in such a way that it generalizes the convolution of regular Borel vector measures as well as that of noncommutative analogues of vector measures. M.G.

N84-13804 Martin Luther-Universitaet, Halle-Wittenberg (East Germany). Section Mathematik.
QUASICON FORMAL EXTENSIONS, FREDHOLM EIGENVALUES, AND GRUNSKY COEFFICIENT CONDITIONS [QUASIKONFORME FORTSETZBARKEIT, FREDHOLMSCHE EIGENWERTE UND GRUNSKYSCHE KOEFFIZIENTENBEDINGUNGEN] c64
Reiner Kuehnau *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 383-391 refs In GERMAN (For primary document see N84-13783 04-59)
Avail: Issuing Activity

The relationship between the conformal representation and a quasiconformal continuation of Fredholm eigenvalues and Grunsky coefficient conditions was analyzed. The limitating conditions of Sigma (Chi) are used to obtain eigenvalue evaluations. Exact eigenvalues were obtained in a few cases, which is important, since eigenvalues for very few curves are known. E.A.K.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N84-13805# National Research Inst. for Oceanology, Stellenbosch (South Africa). Electronic Systems Div.
NRIO MICROCOMPUTER SYSTEM
S. G. Holroyd Apr. 1982 194 p refs
(CSIR-T/SEA-8134; ISBN-0-7988-2202-3) Avail: NTIS HC A09/MF A01

A general purpose modular microcomputer system is described. The system was designed specifically for use in instrumentation and data acquisition systems development. The family of microcomputer cards, peripherals used and associated standard software are discussed. Author

N84-13806# Council for Scientific and Industrial Research, Pretoria (South Africa).
SYMPOSIUM ON COMPUTERS IN CIVIL ENGINEERING
1982 198 p refs Partly in ENGLISH and partly in AFRIKAANS Symp. held in Pretoria, 28 Sep. 1982 Sponsored in part by South African Institution of Civil Engineers
(CSIR-S-267; ISBN-0-7988-2367-4) Avail: NTIS HC A09/MF A01

Systems thinking and computers in engineering organizations, establishing a CP/M based desktop computer, a prototype property data bank for the municipal engineers, the concepts, requirements, and design of a job costing system, computers in the management of a consultant's practice, the geometrical design of tailings dams using computer modelling techniques, drafting, surveying, and records, software requirements for survey networks, computer aided stormwater drainage design, computerized observations of road traffic, data communication, computer aided design for civil engineers. Author

N84-13807# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE DJS-054II MICROCOMPUTER
19 Aug. 1983 4 p Transl. into ENGLISH from Dianzi Jishu (China), no. 11, 1982 p 1
(AD-A132552; FTD-ID(RS)T-0347-83) Avail: NTIS HC A02/MF A01 CSCL 09/2

A description of peripheral equipment and components of the DJS-054II microcomputer are described. B.G.

N84-13808# Naval Postgraduate School, Monterey, Calif.
DESIGN AND IMPLEMENTATION OF A BASIC CROSS-COMPILER AND VIRTUAL MEMORY MANAGEMENT SYSTEM FOR THE TI-59 PROGRAMMABLE CALCULATOR M.S. Thesis
Mark R. Kindl and James H. W. Inskeep, Jr. Jun. 1983 304 p
(AD-A132172; AD-E850405) Avail: NTIS HC A14/MF A01 CSCL 09/2

The instruction set of the TI-59 Programmable Calculator bears a close similarity to that of an assembler. Though most of the calculator instructions perform primitive data movement and/or sequence control, some can do the work of small high level language procedures. Regardless of this fact, to design and debug TI-59 programs of moderate size can be more difficult than doing the computations themselves. Programming in a higher order

language such as BASIC offers many advantages over calculator code. This report presents the design and implementation of a cross-compiler which translates correct BASIC programs into equivalent TI-59 programs. This software package includes a linker which maps calculator instructions to a set of magnetic cards. The cards are then used to implement a manually operated virtual memory system for the calculator. This expands program step capacity, and permits more complex programs to be written in BASIC language for translation into TI-59 instructions.
Author (GRA)

N84-13809# California Univ., Livermore. Lawrence Livermore Lab.
COMMUNICATING BETWEEN THE IBM PERSONAL COMPUTER AND THE WANG WORD-PROCESSING SYSTEM
Robert M. Downey 7 Sep. 1983 19 p
(Contract W-7405-eng-48)
(DE83-017987; UCID-19889) Avail: NTIS HC A02/MF A01

The steps for transferring documents to a Wang word processor from an IBM Personal Computer (PC) and for retrieving stored documents from the Wang are outlined. The hardware and software needed to connect the two systems are reviewed. DOE

N84-13810# California Univ., Livermore. Lawrence Livermore Lab.
VECTORIZING AND MACHINE-SPANNING TECHNIQUES
E. D. Giroux 22 Sep. 1983 10 p refs Presented at the Parallel Computing Conf., Berlin, 26 Sep. 1983
(Contract W-7405-eng-48)
(DE84-000469; UCRL-89740; CONF-8309154-1) Avail: NTIS HC A02/MF A01

Techniques for vectorizing complex logic are shown using a decoupled sliding-surface calculation that is part of a two dimensional Lagrangian simulation model. The same source coding can be run on many vector, parallel, and multiprocessor computers with very little or no alteration. The vectorizing techniques have been used for a wide range of problems. DOE

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N84-13811 Pittsburgh Univ., Pa.
THE DESIGN AND IMPLEMENTATION OF DEBUGGING SYSTEMS FOR LANGUAGES WITH ADVANCED CONTROL STRUCTURES Ph.D. Thesis
Fernando LaforaGarcia 1982 221 p
Avail: Univ. Microfilms Order No. DA8318187

This research deals with the design and implementation of debugging systems for languages possessing advanced control structures. Specifically, the aim of this work is to: (1) investigate debugging tools for a debugging system aimed at languages possessing advanced control structures, (2) design a proper debugging language to interact with the system, and (3) develop a prototype implementation of the system to demonstrate the viability of the language and the system. These three topics are studied following an integrated approach in that any decision made takes into account the effect it has on all three areas. Also, to facilitate the design and implementation, a boot strapping technique is used in both the language and debugging system. The tools provided enable the user to interact with the system in terms of the advanced control structures present in the language. Also, the debugging system is reversible in that it allows the user to: (1) undo commands entered, and (2) reverse the execution of the program. Dissert. Abstr.

N84-13812*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PREWATE: AN INTERACTIVE PREPROCESSING COMPUTER CODE TO THE WEIGHT ANALYSIS OF TURBINE ENGINES (WATE) COMPUTER CODE
Laurence H. Fishbach Dec. 1983 53 p refs
(NASA-TM-83545; E-1917; NAS 1.15:83545) Avail: NTIS HC A04/MF A01 CSCL 09B

The Weight Analysis of Turbine Engines (WATE) computer code was developed by Boeing under contract to NASA Lewis. It was designed to function as an adjunct to the Navy/NASA Engine Program (NNEP). NNEP calculates the design and off-design thrust and sfc performance of User defined engine cycles. The thermodynamic parameters throughout the engine as generated by NNEP are then combined with input parameters defining the component characteristics in WATE to calculate the bare engine weight of this User defined engine. Preprocessor programs for NNEP were previously developed to simplify the task of creating input datasets. This report describes a similar preprocessor for the WATE code.
Author

N84-13813# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
FORTH: AN UNCONVENTIONAL PROGRAMMING LANGUAGE [FORTH: UMA LINGUAGEM DE PROGRAMACAO NAO-CONVENCIONAL]
Edson L. Franca Senne and Maria Teresa B. Rios Sep. 1983 9 p refs In PORTUGUESE; ENGLISH summary Presented at the 3d Microcomputer Software Develop. Symp., Rio de Janerio, 5-7 Dec. 1983
(INPE-2894-PRE/413) Avail: NTIS HC A02/MF A01

FORTH is an interative language that, due to its restrict set of basic functions, can be easily learned and implemented in small computers. The most important characteristic which distinguishes it from the conventional languages is its extensibility: programming in FORTH consists basically in defining new functions. These new functions are incorporated into the language and nothing distinguishes it from the original functions. This allows the user to define his own operations and create his own data types. Thus, FORTH becomes a very useful tool to define oriented languages for specific applications. The language and a portable FORTH simulator, written in PASCAL are presented with a minimal number of primitive functions that permit the user to get acquainted with the FORTH System. Author

N84-13814# National Inst. for Transport and Road Research, Pretoria (South Africa). Safety Engineering Group.
HAZARDOUS LOCATION IDENTIFICATION BY COMPUTER
R. F. DelMistro and E. J. H. deBeer Jun. 1981 54 p refs
(CSIR-TR-RF/6/81) Avail: NTIS HC A04/MF A01

A simple computer model which is able to print out summary tables, a list of hazardous locations, as well as all the data necessary to draw a collision diagram for any or all of these locations is outlined. Author

N84-13815# Junta de Energia Nuclear, Madrid (Spain). Div. de Calculo y Proceso de Datos.
A PROGRAM FOR THE AUTOMATIC REQUEST OF MAGNETIC TAPES FILING AND READING OF ITS CONTENTS (PROCESSOR PCINTA)
J. Casado and J. Gomez 1983 18 p In SPANISH; ENGLISH summary
(JEN-545; ISSN-0081-3397) Avail: NTIS HC A02/MF A01

How to run a program (processor PCINTA) that automatically supplies, from a tape-library, the magnetic tapes requested by the user and allows the filling and the reading of of its contents (recording mode, file information type and file name) is described.
Author

N84-13816# Junta de Energia Nuclear, Madrid (Spain). Div. de Medio Ambiente.
CODE BETAL TO CALCULATION ALPHA/BETA ACTIVITIES IN ENVIRONMENTAL SAMPLES
L. Romero and A. Travesi 1983 46 p refs In SPANISH; ENGLISH summary
(JEN-549; ISSN-0081-3397) Avail: NTIS HC A03/MF A01

A code, 'BETAL', was developed to automate calculations and

presentations of the results of the total alpha-beta activities measurements of environmental samples. This code performs the necessary calculations for transforming the activities measured in total counts, to pCi/1., bearing in mind the efficiency of the detector used and the other necessary parameters. Furthermore, it appraises the standard deviation of the result, and calculates the lower limit of detection for each measurement. This code is written in an iterative way for screen-operator dialogue. The code could be executed through any screen and keyboard terminal, (whose computer accepts FORTRAN IV) with a printer. Author

N84-13817# Computer Systems Management, Inc., Arlington, Va.
THE DEVELOPMENT AND APPLICATION OF AN ADVANCED COMPUTER-BASED SHARED-GRAPHIC WORKSTATION FOR VIDEO TELECONFERENCING Semiannual Technical Report, 1 Oct. 1982 - 31 Mar. 1983
Kevin F. Vest, Keith A. Olson, Patrick L. Jones, and Douglas H. French 1 Sep. 1983 35 p
(Contract MDA903-80-C-0155; ARPA Order 3829)
(AD-A132583; CSMI/TR-83-01) Avail: NTIS HC A03/MF A01 CSCL 09/2

Command and Control requires making complex and/or emergency decisions in various situations. Video teleconferencing has been developed to meet this need. Achieved by using a video based microprocessor, it encompasses a multi-node, low bandwidth five node configuration. Virtual space and shared data are the concepts behind this configuration. These developments led to the simulation of a traditional conference setting by adding shared information to the multi-node teleconference. Shared Graphics Workspace is the resulting effort enabling users to exchange and edit data with little or no training. Author (GRA)

N84-13818# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
FORMAL TECHNIQUES IN THE MANAGEMENT OF SOFTWARE DESIGN Ph.D. Thesis
William E. Richardson 17 Jun. 1983 308 p
(AD-A132569; AFIT/CI/NR-83-28D) Avail: NTIS HC A14/MF A01 CSCL 09/2

The inordinately high cost of software continues to be the major shortcoming in the development of computer systems. In the past, attempts to solve this software crisis have been from one of three independent approaches - using structuring techniques or using formal techniques (together these two are called software engineering) or using management techniques. It is now apparent that this management-technology decoupling is avoidable and that a viable software design methodology must include mutually supportive management, structuring, and formal components. This thesis attempts to develop just such a methodology for the design of large systems. The author proposes a set of criteria which will be used to evaluate design methodologies. Based on these criteria and research into existing methodologies, he then outlines his new methodology. It utilizes the advantages of high level abstraction, and extensible set theoretical notation, hierarchical structuring, and numerous management techniques. A simple example is given to introduce the design style and notation. In order to assess the new methodology and its interaction of management and software engineering techniques, he does a case study development of a windowed, information sharing display and filling system. GRA

N84-13819# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
INTERACTIVE SURFACE VISUALIZATION USING RASTER GRAPHICS Ph.D. Thesis
Dennis Lee Schweitzer Aug. 1983 106 p Original contains color illustrations
(AD-A132548; AFIT/CI/NR-83-31D) Avail: NTIS HC A06/MF A01 CSCL 09/2

Computer generated shaded images have evolved to a stage of extreme realism and can easily be confused for photographs of 'real' objects. Such imitation of realism has been the major thrust of computer graphic research in recent years with efforts to model such physical phenomena as light reflection, surface texture, shadows, and transparency. Although this realism has been successful in limitating photographs, several applications exist in which the viewers are more interested in an exact knowledge of the three dimensional shape of the surface than simply a realistic shaded reproduction. The goal of this research is to investigate interactive techniques for displaying shaded images with enhanced three dimensionality. Two basic approaches are investigated: direct rendering and viewing of shape information, and imitation of visual perception stimuli. The first approach consists of directly rendering depth and normal information into the frame buffer and examining meaningful ways of viewing the information. The second approach uses the results of research in the field of visual perception to generate cues for enhanced three dimensional visualization. The stimulations which are investigated are texture gradients, gradients of illumination, binocular stereopsis, and motion. Each technique is investigated in an interactive environment to allow greater control over the shape analysis. Author (GRA)

N84-13820# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
PLANAR EMBEDDING OF PLANAR GRAPHS
Danny Dolev, Frank Thomson Leighton, and Howard Trickey Feb. 1983 10 p
(Contract N00014-80-C-0622; Grant NSF MCS-80-12907)
(AD-A132538; MIT/LCS/TM-237) Avail: NTIS HC A02/MF A01 CSCL 12/1

Planar embedding with minimal area of graphs on an integer grid is an interesting problem in VLSI (Very Large Scale Integrated) theory. Valiant gave an algorithm to construct a planar embeddding for trees in linear area; he also proved that there are planar graphs that require quadratic area. We fill in a spectrum between Valiant's results by showing that an N-node planar graphs has a planar embedding with area 0(NF), where F is a bound on the path length from any node to the exterior face. In particular, an outerplanar graph can be embedded without crossovers in linear area. This bound is tight, up to constant factors: for any N and F, there exist graphs requiring omega(NF) area for planar embedding. Also, finding a minimal embedding area is shown to be Nu-complete for forests, and hence for more general types of graphs. GRA

N84-13821# Cincinnati Univ., Ohio. Dept. of Mechanical and Industrial Engineering.
USER'S MANUAL FOR CABLE: A THREE-DIMENSIONAL, FINITE-SEGMENT COMPUTER CODE FOR SUBMERGED AND PARTIALLY SUBMERGED CABLE SYSTEMS
James W. Kamman and Ronald L. Huston 1 May 1983 41 p
(Contract N00014-76-C-0139)
(AD-A132515; UC-MIE-050183-15-ONR) Avail: NTIS HC A03/MF A01 CSCL 09/2

This manual provides instruction for using CABLE to study such cable systems. It also provides sample input and output data. The computer program itself is written in FORTRAN. Hence, the input requirements are in the FORTRAN format. The CABLE is designed to perform the following dynamic analyses: (1) the physical data of the cable (weight, diameter, length) and the physical data of the towed body; (2) the configuration of the cable branches; (3) the fluid properties; (4) the motion of the towed end of the cable; and (5) the initial configuration of the cable system; then the program determines the kinematics (position, velocity, and acceleration) at the various points of the cable system as well as the cable tension. GRA

N84-13822# Minnesota Univ., Minneapolis. Dept. of Computer Science.
SCHEDULING SUPERCOMPUTERS
Sartaj Sahni Feb. 1983 29 p
(Contract N00014-80-C-0650)
(AD-A132512; TR-83-3) Avail: NTIS HC A03/MF A01 CSCL 12/1

We develop good heuristics to schedule tasks on supercomputers. Supercomputers comprised of multiple pipelines as well as those comprised of asynchronous multiple processors are considered. In addition, we consider the case when different pipes or processors run at different speeds. Author (GRA)

N84-13823# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
IMPOSSIBILITY OF DISTRIBUTED CONSENSUS WITH ONE FAULTY PROCESS
Michael J. Fischer, Nancy A. Lynch, and Michael S. Paterson Sep. 1982 13 p
(Contracts N00014-82-K-0154; DAAG29-79-C-0155; NR Proj. 049-456)
(AD-A132503; MIT/LCS/TR-282) Avail: NTIS HC A02/MF A01 CSCL 09/2

The consensus problem involves an asynchronous system of processes, some of which may be unreliable. The problem is for the reliable processes to agree on a binary value. We show that every protocol for this problem has the possibility of nontermination, even with only one faulty process. By way of contrast, solutions are known for the synchronous case, the Byzantine Generals problem. Author (GRA)

N84-13824# Rensselaer Polytechnic Inst., Troy, N. Y. Image Processing Lab.
GENERATING THREE-DIMENSIONAL SURFACE MODELS OF SOLID OBJECTS FROM MULTIPLE PROJECTIONS
Michael Potmesil Oct. 1982 257 p
(Contract N00014-82-K-0301)
(AD-A132392; IPL-TR-033) Avail: NTIS HC A12/MF A01 CSCL 09/2

A recurring problem in computer vision and related fields is that of generating computer models of physical objects. This thesis presents a method for constructing such models in the form of three-dimensional surface or volume descriptions. The surface models are composed of curved, topologically rectangular, parametric patches. The data required to define these patches are obtained from multiple photographic images of the object illuminated by a rectangular pattern of lines. The projection of the pattern on the surface of the object traces curves which define the boundaries of the patches. The 3D description of the patches is reconstructed by photogrammetric techniques from two or more images of the projected pattern. A calibration stand, in which the object is placed, permits determination of the camera geometry directly from image data. Once the surface descriptions are in the same object space, they are also merged into a common parameter space. This match-and-merge process is iteratively repeated for pairs of surface descriptions until a complete model of the object is assembled. GRA

N84-13825# Rochester Univ., N. Y. Dept. of Computer Science.
FOUR FRAMES SUFFICE. A PROVISIONARY MODEL OF VISION AND SPACE
Jerome A. Feldman Sep. 1982 62 p
(Contracts N00014-82-K-0193; N00014-78-C-0164)
(AD-A132359; TR-99) Avail: NTIS HC A04/MF A01 CSCL 12/1

This paper presents a general computational treatment of how mammals are able to deal with visual objects and environments. Among the issues addressed are: constancies and the stable visual world, indexing and context effects, perceptual generalization and allocentric spatial maps. The computational model is expressed in connectionist terms, allowing biological as well as psychological experiments to be included. The model relies heavily on contemporary work in artificial intelligence, but is claimed to be consistent with all relevant findings. Author (GRA)

N84-13826# Massachusetts Inst. of Tech., Cambridge. Lab. for Artificial Intelligence.
ISSUES IN THE DESIGN AND IMPLEMENTATION OF ACT2 M.S. Thesis
Daniel Gary Theriault Jun. 1983 216 p Revised
(Contract N00014-80-C-0505)
(AD-A132326; AD-F630051; AI-TR-728) Avail: NTIS HC A10/MF A01 CSCL 09/2

Act2 is highly concurrent programming language designed to exploit the processing power available from parallel computer architectures. The language supports advanced concepts in software engineering, providing high-level constructs suitable for implementing artificially-intelligent applications. Act2 is based on the Actor model for computation, consisting of virtual computational agents which communicate by message-passing. Act2 serves as a framework in which to integrate an actor language, a description and reasoning system, and a problem-solving and resource management system. This document describes issuess in Act2's design and the implementation of an interpreter for the language. GRA

N84-13827# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
A TECHNICAL OVERVIEW OF THE NATIONAL SOFTWARE WORKS
Richard E. Schantz and Robert H. Thomas Griffiss AFB, N.Y. RADC Mar. 1983 118 p
(Contract F30602-81-C-0213; AF Proj. 2531)
(AD-A132320; BBN-5238; RADC-TR-83-80) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report presents a technical overview of the National Software Works System architecture and design. The NSW is a working example of a network operating system, which is intended to integrate and provide uniform access to software tools residing on a number of constituent host systems connected to the ARPA Network. Author (GRA)

N84-13828# Naval Postgraduate School, Monterey, Calif.
THE DESIGN OF BACKTRACK ALGORITHMS M.S. Thesis
Gary Loberg Jun. 1983 95 p
(AD-A132299) Avail: NTIS HC A05/MF A01 CSCL 09/2

The backtrack control structures is a well known combinatorial problem solving approach in computer science. The strategy can be abstracted into a program schema with slots for lower level functions which is suitable for the automated synthesis of backtrack programs. Employing a known model of program synthesis based on a problem reduction problem representation, two reduction rules are developed for transforming a problem specification into a backtrack control structure with specifications for lower level functions. We illustrate these rules with sample problems. Author (GRA)

N84-13829# Naval Postgraduate School, Monterey, Calif.
MODEL STATEMENT LANGUAGE/ANALYZER (MSL/MSA): A TOP-DOWN PROBLEM STATEMENT LANGUAGE/ANALYZER (PSL/PSA) APPROACH FOR THE USER DIALOGUE IN DECISION SUPPORT SYSTEMS M.S. Thesis
John Joseph Troy Jun. 1983 58 p
(AD-A132273) Avail: NTIS HC A04/MF A01 CSCL 05/1

This thesis examines the concept of a top-down approach to providing natural language interface and more simple and flexible model manipulation for users of decision support systems, through the use of a model statement language/model statement analyzer (MSL/MSA). Patterned after problem statement language/problem statement analyzer (PSL/PSA), the MSL/MSA is a software tool which interprets user input and assists the user through iterative and interactive heuristic problem-solving searches through levels and categories of models, functions, and equations. Author (GRA)

N84-13830# Naval Postgraduate School, Monterey, Calif.
UTILIZATION OF ADA AS A PROGRAM DESIGN LANGUAGE M.S. Thesis
George J. Wylie and Thomas R. Watt Jun. 1983 111 p
(AD-A132244) Avail: NTIS HC A06/MF A01 CSCL 09/2

In terms of manpower, time and money, the single largest investment that must be made in the acquisition and maintenance of a large and complex computer system is the investment made in software. In response to this situation, DOD began an intensive and comprehensive research and development effort in an attempt to reduce, if not eliminate the inherent problems associated with software system design. The end result of this effort was the creation of the Ada programming language. This thesis will examine the development of the language, focusing attention on the concepts and features which make Ada a potential software crisis

solution. These concepts and features will be further examined as to the extent to which they support the utilization of Ada as a program design language. GRA

N84-13831# Naval Postgraduate School, Monterey, Calif. Dept. of Statistics.
A USER'S GUIDE TO ARSPIQ: THE UNIVARIATE TIME SERIES ANALYSIS PROGRAM FOR AUTOREGRESSIVE SPECTRAL INFORMATION QUANTILE IDENTIFICATION
Terry J. Woodfield Aug. 1983 108 p
(Contracts DAAG29-83-K-0051; N00014-83-WRM3008; Proj. 4858)
(AD-A132217; TR-A-25; ARO-20140.3-MA) Avail: NTIS HC A06/MF A01 CSCL 09/2

The ARSPIQ (AutoRegressive Spectral Information Quantile identification) program is a modified version of ARSPID, a univariate time series program in the TIMESBOARD Computing Library. ARSPIQ provides various diagnostics in the time and frequency domains to help one determine whether a time series is long, short, or no memory. ARSPIQ is written in FORTRAN and consists of a main program and 58 subprograms, many of which are contained in the TIMESBOARD Computing Library. Many of the subprograms used in the quantile analysis are modified version of those used by the ONESAM program. The basic goal of ARSPIQ is to provide diagnostics to aid in modeling a univariate time series. ARSPIQ is not intended to be a modeling or forecasting program, however. The models produced by ARSPIQ are intended only as guides to formulate more complete, rigorous, or valid models. The author's approach is to run ARSPIQ to obtain useful model building diagnostics and then to employ ARSPID in the more formal model building stage, i.e., estimating parameters and checking residuals. With this goal in mind, ARSPIQ has been made as fully automatic as possible with logical defaults provided when input options are specified to be zero. GRA

N84-13832# Naval Postgraduate School, Monterey, Calif.
AUTOMATED DESIGN OF MICROPROCESSOR-BASED DIGITAL FILTERS M.S. Thesis
Martin Ralph Heilstedt Jun. 1983 192 p
(AD-A132214) Avail: NTIS HC A09/MF A01 CSCL 09/2

This thesis investigates the feasibility of automating the design of microprocessor-based digital filters. The ability of a prototype design system to successfully produce filter realizations is tested. General filter structures and programming algorithms are presented. Shortcomings in the current version of the design system are determined. Modifications are made as required to support digital filter realizations. The feasibility of filter generation is demonstrated using realistic examples taken from the literature. GRA

N84-13833# Naval Postgraduate School, Monterey, Calif.
DEVELOPMENT OF A GIFTS (GRAPHICS-ORIENTED INTERACTIVE FINITE-ELEMENT TIME-SHARING SYSTEM) PLOTTING PACKAGE COMPATIBLE WITH EITHER PLOT10 OR IBM/DSM GRAPHICS M.S. Thesis
Thomas R. Pickles Jun. 1983 54 p
(AD-A132195) Avail: NTIS HC A04/MF A01 CSCL 09/2

The objectives of this work are to implement the latest version of the Graphics-Oriented Interactive Finite-Element Time-Sharing system (GIFTS) on the IBM-370, to modify the GIFTS plotting package for compatibility with the IBM dual screen management (IBM/DSM) graphics package, and to test the various GIFTS capabilities, some of which have not been used or tested at the Naval Postgraduate School. GIFTS can now be used with either the IBM dual screen graphics stations or a PLOT10 compatible terminal. Author (GRA)

N84-13834# Argonne National Lab., Ill.
COMPUTER SOFTWARE SUMMARIES, NUMBERS 424 THROUGH 693
Aug. 1983 182 p
(Contract W-31-109-eng-38)
(DE83-015297; ANL-8040-Suppl-6) Avail: NTIS HC A09/MF A01

The National Energy Software Center (NESC) serves as the software exchange and information center for the US Department of Energy and the Nuclear Regulatory Commission. The objective of the Center's program is to provide the means for software sharing among agency offices and contractors, and to facilitate the transfer of agency developed computer applications and technology to the information processing community. To achieve these goals a major activity of the Center is the preparation and publication of two reports issued periodically - the Center's compilation of program abstracts, ANL-7411, and this software summaries report, ANL-8040. The abstracts describe the software packages available in the software exchange library maintained and distributed by the Center. The summaries describe agency sponsored software which is at the specification stage, under development, being checked out, in use, or available at agency offices, laboratories, and contractor installations. DOE

N84-13835# California Univ., Livermore. Lawrence Livermore Lab. Methods Development Group.
FACET: A RADIATION-VIEW-FACTOR COMPUTER CODE FOR AXISYMMETRIC, 2D PLANAR AND 3D GEOMETRIES WITH SHADOWING
Arthur B. Shapiro Aug. 1983 35 p refs
(Contract W-7405-eng-48)
(DE84-000359; UCID-19887) Avail: NTIS HC A03/MF A01

The computer code FACET calculates the radiation geometric veiw factor (alternatively called shape factor, angle factor, or configuratioin factor) between surfaces for axisymmetric, two dimensional planar and three dimensional geometries with interposed third surface obstructions. It was developed to calculate view factors for input to finite-element heat-transfer analysis codes. Previous radiation-view-factor computer codes are reviewed. The defining integral equation for the geometric view factor between two surfaces and the assumptions made in its derivation are presented. The numerical algorithms used to integrate this equation for the various geometries are also given. The algorithms used to detect self-shadowing and third-surface shadowing between the two surfaces for which a view factor is being calculated are described. Finally, a user's input guide followed by several example problems are provided. DOE

N84-13836# Pacific Northwest Lab., Richland, Wash.
DEVELOPING COMPUTER-GRAPHICS PROGRAMS FOR SPECIALIZED APPLICATIONS
R. J. Littlefield Jul. 1983 41 p Presented at the Tutorial Session at SIGGRAPH '83 Ann. Conf., Chicago, 26 Jul. 1983
(Contract DE-AC06-76RL-01830)
(DE83-016181; PNL-SA-11444; CONF-830775-1) Avail: NTIS HC A03/MF A01

General techniques for developing specialized applications of computer graphics are described. Both the final form of application software, and the process by which it is developed are discussed. The presentation is organized as follows: overview of the general principles; description of the geographic mapping applications and its implementation; and discussion of the general principles as reflected in the mapping applications. DOE

N84-13837# Illinois Univ., Urbana. Dept. of Physics.
FASTBUS DIAGNOSTIC LANGUAGE USERS MANUAL, VERSION 3(74)
David Lesny Jul. 1983 168 p
(Contract DE-AC02-76ER-01195)
(DE83-017932; DOE/ER-01195/478; COO-1195-478) Avail: NTIS HC A08/MF A01

FASTBUS Diagnostic Language (FDL) is an interactive interpretive language designed to aid the engineer or physicist/user in the testing and debugging of FASTBUS modules and systems. Since FASTBUS systems involve a variety of devices and data paths, it is frequently more efficient to utilize a high-level language system such as FDL for diagnostics, rather than to develop device-specific programs. The FDL can also be used to a limited extent for both device control and data acquisition. DOE

N84-13838# Argonne National Lab., Ill.
PARTICIPATION OF VAX VMS COMPUTERS IN IBM FILE-TRANSFER NETWORKS
Richard C. Raffenetti 1983 12 p refs Presented at the Digital Equipment Computer Users Soc. (DECUS) Symp., St. Louis, 23 May 1983
(Contract W-31-109-eng-38)
(DE83-017945; CONF-830577-4) Avail: NTIS HC A02/MF A01

Communications software written at Argonne National Laboratory enables VAX VMS computer systems to participate as end nodes in a standard IBM file transfer network. The software, which emulates the IBM Network Job Entry (NJE) protocol, has been in use at Argonne for over two years, and is in use at other installations. The basic NJE services include transfer of print and punch files, job submittal, execution of remote commands, and transmission of user to user messages. The transmit services are asynchronous to the user's VMS session and received files are automatically routed to a designated user directory. Access to files is validated according to the VMS protection mechanism. New features which were added recently include application level software to transfer general, sequential files and to bridge the electronic mail systems of VMS and VM/CMS. This paper will review the NJE emulator and describe the design and implementation of the sequential file transfer service. The performance of the emulator will be described. DOE

N84-13839# Sandia Labs., Albuquerque, N. Mex. Management Information Div.
COMPUTERIZED ART PLOTTING SYSTEM. VOLUME 1: HORIZONTAL BAR CHARTS (SECOND EDITION)
Hesa Yano and Nicholas A. Sabo Sep. 1983 16 p
(Contract DE-AC04-76DP-00789)
(DE83-018113; SAND-83-8029) Avail: NTIS HC A02/MF A01

Instructions are given for creating horizontal charts using the VAX2 computer, a VT-100 terminal, a Tektronix 4014 terminal, and a COBOL program based on the DISSPLA plotting package. The charts are of high quality and suitable for reports, journal articles, Vu-Graphs, and 35 mm slides. DOE

N84-13840# Sandia Labs., Albuquerque, N. Mex. Engineering Sciences.
USER'S GUIDE TO SANDIA TEX
W. Hermann, M. L. Blanford, and M. P. Sears May 1983 124 p refs
(Contract DE-AC04-76DP-00789)
(DE83-016763; SAND-82-2981) Avail: NTIS HC A06/MF A01

TEX is a powerful typesetting system, developed by D.E. Knuth at Stanford University, which is particularly suited to producing mathematical manuscripts. A set of macros to simplify the use of TEX, called Facil TEX, has been developed by M. Diaz of the same institution. These macros have been modified at Sandia National Laboratories to meet local requirements. This manual has been designed to cover many of the features of TEX and Facil TEX. It has been written for the beginning user with no previous experience in TEX. However, it may also serve as a reference manual for the experienced user. DOE

N84-13841# Argonne National Lab., Ill.
ALGORITHMS FOR AUTOMATED DIAGNOSIS OF FAULTS IN PHYSICAL PLANT
J. R. Gabriel May 1983 40 p refs
(Contract W-31-109-eng-38)
(DE84-000192; ANL-83-70) Avail: NTIS HC A03/MF A01

A diagnostic automation that can be used to investigate classes of systems without feedback loops is presented. The input needed for the automation, the algorithm used, and the PROLOG program for the simulation are described. DOE

N84-13842# Bendix Corp., Kansas City, Mo.
INVESTIGATION IN THE APPLICATION OF COMPUTER-AIDED PROCESS-PLANNING TECHNIQUES FOR MECHANICAL ENGINEERING AT BENDIX KANSAS CITY Final Report
S. L. Brooks Aug. 1983 25 p refs
(Contract DE-AC04-76DP-00613)
(DE84-000302; BDX-613-2982) Avail: NTIS HC A02/MF A01

Computer-aided process planning (CAPP) was found to have good potential application for mechanical engineering. A working knowledge of CAPP techniques and current state-of-the-art was gained. Potential applications that used a variant system were defined. An implementation plan was established to develop and evaluate CAPP for mechanical engineering. DOE

N84-13843# California Univ., Livermore. Lawrence Livermore Lab.
SISAL: STREAMS AND ITERATION IN A SINGLE-ASSIGNMENT LANGUAGE. LANGUAGE REFERENCE MANUAL, VERSION 1.1
James McGraw, Stephen Skedzielewski, Stephen Allan, Dale Grit, Rod Oldehoeft, John Glauert, Ivan Dobes, and Paul Hohensee 20 Jul. 1983 83 p refs Prepared in cooperation with Colorado State Univ., Fort Collins, Manchester Univ., England, and Digital Equipment Corp., Hudson, Mass.
(Contract W-7405-eng-48)
(DE83-016576; LLL/M-146) Avail: NTIS HC A05/MF A01

To facilitate the use and comparison of multiprocessor systems, a common high level language was proposed. The primary candidate was a single assignment, applicative, all proposed systems could benefit from the functional semantics of such a language, and from other characteristics such as implicit parallelism, freedom from side effects, locality of effects, etc. A compiler would be produced having a single front end (language specific) parser and several back end (machine specific) code generators. An intermediate format is defined to serve as the interface between parser and code generators and interface between this system and other language systems. Benchmark programs were produced. The language, SISAL, is designed to express algorithms for execution on computers capable of highly concurrent operation. More specifically, the application area to be supported is numerical computation which strains the limits of high performance machines, and the primary targets for translation of SISAL programs are data flow data driven machines. DOE

N84-13844# Oak Ridge National Lab., Tenn.
SHORT INTRODUCTION TO OFFICE APPLICATIONS OF MARKUP LANGUAGE
John David Mason 1983 6 p Presented at the Assoc. Franc. de Normalisation (AFNOR) Meeting, Paris, 12 Apr. 1983
(Contract W-7405-eng-26)
(DE83-011400; CONF-8304912-2) Avail: NTIS HC A02/MF A01

A markup standard consisting of a set of tools for describing the structures of documents is discussed. The capabilities of such a standard are examined with reference to an electronic mail system. M.G.

N84-13845# California Univ., Livermore. Lawrence Livermore Lab.
T-HEMP3D USER MANUAL
David Turner Aug. 1983 203 p refs
(Contract W-7405-eng-48)
(DE84-000526; UCID-19873) Avail: NTIS HC A10/MF A01

The T-HEMP3D (Transportable HEMP3D) computer program is a derivative of the STEALTH three dimensional thermodynamics code. The STEALTH code, in turn, is based entirely on the original HEMP3D code written at Lawrence Livermore National Laboratory. The primary advantage STEALTH has over its predecessors is that it was designed using modern structured design techniques, with rigorous programming standards enforced. This yields two benefits. First, the code is easily changeable; this is a necessity for a physics code used for research. The second benefit is that the code is easily transportable between different types of computers. The STEALTH program was transferred to LLNL under a cooperative development agreement. Changes were made primarily in three areas: material specification, coordinate generation, and the addition of sliding surface boundary conditions. The input to T-HEMP3D is summarized. DOE

N84-13846# Sandia Labs., Albuquerque, N. Mex.
PORTABLE FORTRAN CONTOUR-PLOTTING SUBPROGRAM
Karen H. Haskell Jul. 1983 31 p refs
(Contract DE-AC04-76DP-00789)
(DE83-017422; SAND-83-0011) Avail: NTIS HC A03/MF A01

A contour plotting FORTRAN subprogram is discussed. While contour plotting subroutines are available in many commercial plotting packages, this routine has the following advantages: (1) since it uses the Weasel and VDI plot routines developed at Sandia, it occupies little storage and can be used on most of the Sandia time-sharing systems as part of a larger program; (2) the contour computation algorithm is efficient and robust, and computes accurate contours for sets of data with low resolution; and (3) the subprogram is easy to use. A simple contour plot can be produced with a minimum of information provided by a user in one FORTRAN subroutine call. Through the use of a wide variety of subroutine options, many additional features can be used. These include such items as plot titles, grid lines, placement of text on the page, etc. The subroutine is written in portable FORTRAN 77, and is designed to run on any system which supports the Weasel and VDI plot packages. It also uses routines from the SLATEC mathematical subroutine library. DOE

N84-13847# Oak Ridge Gaseous Diffusion Plant, Tenn. Technical Applications.
ANALYSIS/PLOT: A GRAPHICS PACKAGE FOR USE WITH THE SORT/ANALYSIS DATA BASES
C. A. Sady Aug. 1983 37 p refs
(Contract W-7405-eng-26)
(DE83-017886; K/CSD-TM-48) Avail: NTIS HC A03/MF A01

A graphics package that is used with the SORT/ANALYSIS data bases is described. The data listed by the SORT/ANALYSIS program can be presented in pie, bar, line, or Gantt chart form. Instructions for the use of the plotting program and descriptions of the subroutines are given. DOE

N84-13848# California Univ., Livermore. Lawrence Livermore Lab.
OVERVIEW OF DIGITAL-IMAGE PROCESSING
R. E. Twogood and R. J. Sherwood 1983 7 p refs Presented at the 26th Midwest Symp. on Circuits and Systems, Puebla, Mexico
(Contract W-7405-eng-48)
(DE84-000156; UCRL-89706; CONF-8308127-1) Avail: NTIS HC A02/MF A01

The field of digital-image processing is reviewed. Particular attention is devoted to the fundamental concepts involved in image processing, including image digitization and typical goals. Some of the most important image processing algorithms are also discussed, with emphasis on techniques that are applicable across a broad range of applications. DOE

N84-13849# California Univ., Livermore. Lawrence Livermore Lab.
COMPUTER IMPLEMENTATION, ACCURACY, AND TIMING OF RADIATION VIEW-FACTOR ALGORITHMS
Arthur B. Shapiro Jul. 1983 7 p refs Presented at the ASME Winter Meeting, Boston, 14-18 Nov. 1983
(Contract W-7405-eng-48)
(DE83-017618; UCRL-89602; CONF-831111-8) Avail: NTIS HC A02/MF A01

The three dimensional finite element thermal analysis of enclosure radiation problems requires the calculation of the geometric surface to surface radiation view factors. The view factors can be calculated by either area or line integration algorithms. This paper addresses the implementation, accuracy and computational time involved in using these algorithms. Additionally, an algorithm to identify shadowing surfaces and methods to adjust the calculated view factors for increased accuracy are presented. DOE

N84-13850# Los Alamos Scientific Lab., N. Mex. Theoretical Appliations Div.
VARIATIONAL METHOD FOR ADAPTIVE GRID GENERATION
J. U. Brackbill 1983 11 p refs Presented at the Workshop on Advan. in Computational Eng. Mech., Dalian, China, 4 Sep. 1983
(Contract W-7405-eng-36)
(DE83-017312; LA-UR-83-2493; CONF-8309135-3) Avail: NTIS HC A02/MF A01

A variational method for generating adaptive meshes is described. Functionals measuring smoothness, skewness, orientation, and the Jacobian are minimized to generate a mapping from a rectilinear domain in natural coordinate to an arbitrary domain in physical coordinates. From the mapping, a mesh is easily constructed. In using the method to adaptively zone computational problems, as few as one third the number of mesh points are required in each coordinate direction compared with a uniformly zoned mesh. DOE

N84-13851# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
DIGITAL EQUIPMENT CORPORATION, VAX 11/750, VAL-11 COBOL VERSION 2.2 (COBOL TECHNICAL REPORT)
10 May 1983 17 p
(PB83-241596; OSD/FSTC-83/201) Avail: NTIS HC A02/MF A01 CSCL 09B

This FSTC Technical Report for the Digital Equipment Corp., VAX-11 COBOL Version 2.2 running under the VAX/VMS Version 3.2 provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the indexed 1-0, Levels 1 and a2 Sdort/Merge, Levels 1 and 2 Relative 1-0, Level 2 of the 1974 COBOL Standard (x3.23-1974/FIPS PUB 21-1). This technical report is made up of several sections showing all the discrepancies found, if any. A companion report Validation Summary Report OSD/FSTC-83/200 provides information regarding the validation of the compiler as the Low-Intermediate level of Federal Standard COBOL (FIPS PUB 21-1). GRA

N84-13852# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
IBM CORPORATION IBM4341 IBM BASIC RELEASE 1.0 Validation Summary Report
1 Jul. 1983 11 p
(PB82-240945; OSD/FSTC-83/221) Avail: NTIS HC A02/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the IBM Corporation, IBM BASIC Release 1.0 running under the VM/SP Release 1.1 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 BASIC Standard (X3.60-1978/FIPS PUB 68). The compiler was validated against the Minimal BASIC level of FIPS PUB 68. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies within X3.60-1978 and a detailed listing of discrepancies together with the tests which failed. GRA

N84-13853# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
DATAPOINT CORPORATION DATAPOINT 8800 RMS COBOL 2.3.A Validation Summary Report
7 Feb. 1983 59 p
(PB83-240962; OSD/FSTC-83/105) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Data-point Corporation, COBOL Release 2.3 running under the RMS Release 1.10 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the Low-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N84-13854# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
DATAPOINT CORPORATION, DATAPOINT 8800, RMS COBOL 2.3.A
5 Apr. 1983 13 p
(PB83-241075; OSD/FSTC-83/106) Avail: NTIS HC A02/MF A01 CSCL 09B

This FSTC Technical Report for the Datapoint Corporation, COBOL Release 2.3 running under the RMS Release 1.10 provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the indexed 1-0, Level 1 of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). This technical report is made up of several sections showing all the discrepancies found, if any. A companion report Validation Summary Report OSD/FSTC-83/105 provides information regarding the validation of the compiler as the Low-Intermediate level of Federal Standard COBOL (FIPS PUB 21-1). GRA

N84-13855# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
NORTHERN TELECOM, INCORPORATED NTI-585 A COBOL/3 RELEASE 3 Validation Summary Report
6 May 1983 60 p
(PB83-241513; OSD/FSTC-83/185) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Northern Telecom, Inc., A COBOL/3 Release 3 running under the OMNIT-ASK 4.1 Release A10 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the Low-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N84-13856# National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
SPECIFICATION AND INTERPRETATION OF DATA MODEL SEMANTICS: AN INTEGRATION OF TWO APPROACHES
Winfried Lamersdorf Jul. 1983 58 p refs
(PB83-249714; NBSIR-83-2740) Avail: NTIS HC A04/MF A01 CSCL 09B

Two different approaches to data base model description and evaluation are presented, compared, and integrated: a formal semantic specification method as originally developed for programming languages; and a computer based data model processor to be used as a rapid prototyping system. Both ways to specify data base model semantics are applied to a common example. Two alternatives to combine the advantages of both methods are analyzed in detail. GRA

N84-13857# National Bureau of Standards, Washington, D.C. Systems and Network Architecture Div.
PROCEEDINGS OF THE THIRD LAN-TRANSPORT WORKSHOP. REPORT OF THE THIRD WORKSHOP FOR LOCAL AREA NETWORK IMPLEMENTORS OF THE NBS SPECIFICATIONS OF THE INTERNATIONAL STANDARDS ORGANIZATION TRANSPORT CLASS 4 PROTOCOL SPECIAL INTEREST GROUP ON FILE TRANSFER PROTOCOL
Jul. 1983 21 p refs Workshop held in Washington, D. C., 18-20 Jul. 1983
(PB83-251348; NBSIR-83-2757) Avail: NTIS HC A02/MF A01 CSCL 09B

The National Bureau of Standards' Institute for Computer Sciences and Technology (CST) has prepared specifications for the International Organization for Standardization's (SO) Class 4 Transport Protocol. The third in the series of LAN/Transport Workshops is covered and agreements on the specifics of the transfer protocol are reported. GRA

N84-13858# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
HEWLETT PACKARD HP 3000 SERIES 40, COBOL 11/3000 VERSION A.00.09 Validation Summary Report
21 Jun. 1983 53 p
(PB83-254805; OSD/FSTC-83/210) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Hewlett Packard, COBOL II/3000 Release A.00.09 running under the MPE IV Release C.01.00 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the Low-Intermeidate level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N84-13859# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
HEWLETT PACKARD HP 3000 SERIES 40, COBOL 11/3000 VERSION A.00.09 (COBOL TECHNICAL REPORT)
21 Jun. 1983 26 p
(PB83-254813; OSD/FSTC-83/211) Avail: NTIS HC A03/MF A01 CSCL 09B

This FSTC Technical Report for the Hewlett Packard, COBOL II/3000 Release A.00.09 running under the MPE IV Release C.01.00 provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the Inter Program communication, Levels 1 and 2; Indexed I-0, Levels and 1 and 2; Library, Level 2; Nucleus, Level 2; Relative I-0, Level 2 Segmentation, Level 2, Sequential I-0, Level 2 Sort/Merge, Levels 1 and 2 Table Handling, Level 2 of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). This technical report is made up of several sections showing all the discrepancies found - if any. A companion report Validation Summary Report OSD/FSTC-83/210 provides information regarding the validation of the compiler as the Low-Intermediate level of Federal Standard COBOL (FIPS PUB 21-1). GRA

62 COMPUTER SYSTEMS

Includes computer networks.

N84-13860 California Univ., Berkeley.
FILE MIGRATION IN DISTRIBUTED COMPUTER SYSTEMS Ph.D. Thesis
Juan Burrut Porcar 1983 160 p
Avail: Univ. Microfilms Order No. DA8312939

The main thrust of this research is concerned with the file assignment problem in computer systems. The methodology for studying the File Assignment Problem is based on the following stepc: (1) Gather measurement data from existing file systems. (2) Use analytical techniques to model important aspects of the file referencin process. (3) Devise file migration algorithms based on the analysis. (4) Run trace-driven simulations to test the algorithms. Measurement data (traces of activity) obtained from large centralized IBM installation were used. The traces were extracted by the System Management Facility (SMF) and were processed and filtered to make them usable both in statistical analysis and in trace-driven simulations. The first step in the study of the file assignment problem is an exploratory analysis of the data. The statistical analysis provides information about the systems in general and about the files in particular. Dissert. Abstr.

N84-13861# Naval Postgraduate School, Monterey, Calif. Dept. of Computer Science.
BENCHMARKING THE JOIN OPERATIONS OF RELATIONAL DATABASE MACHINES M.S. Thesis

Michael D. Crocker Jun. 1983 60 p Presented at the Intern. Workshop on Database Machines, Munich, Sep. 1983
(AD-A132312) Avail: NTIS HC A04/MF A01 CSCL 09/2

Over the past several years benchmarking has been developed into an effective technique for performance analyses of computer systems. Relational database machines are relatively new computer systems for which a benchmarking technique does not yet exist. The benchmarking of relational database machine involves the identification and design of test programs through which relevant performance data can be gathered and interpreted. All features of relational database management must be considered when designing these test programs. The join operations are an important feature of relational database management. The test programs for the join operations necessarily include the repetition of certain queries during which specific join parameters are varied. These parameters include: tuple size, relation size, disk placement, and the use of indices. A number of join operations have been benchmarked. These operations are equality joins, inequality joins, three-way joins, and virtual joins (i.e., views). In addition, a number of relational database machine configurations have been utilized for benchmarking the join operations. The highlights of the thesis can be found in its contribution to a benchmarking technique for the join operations and its conclusions on the performance analyses of various relational machines in operating joins. Author (GRA)

N84-13862# Naval Postgraduate School, Monterey, Calif.
LOGIC DESIGN OF A SHARED DISK SYSTEM IN A MULTI-MICRO COMPUTER ENVIRONMENT M.S. Thesis
Mark L. Perry Jun. 1983 201 p
(AD-A132165; AD-E850405) Avail: NTIS HC A10/MF A01 CSCL 09/2

This thesis describes the detailed interface design and implementation of the Micropolis 1220 rigid disk storage unit into the AEGIS multiuser environment. At the onset of this work, the AEGIS development system consisted of an MBB-80 bubble memory, the REMEX Data Warehouse disk system, and four INTEL iSBC 86/12A single board computers. The micropolis interface was accomplished utilizing the INTEL 8255 programmable parallel I/O port resident on one of the AEGIS iSBC 86/12A computers. The iSBC 86/12A used for the interface can still be operated as an independent computer with all Micropolis disk operations being transparent to the user. The Micropolis disk unit adds an additional 35.6 megabytes of online storage to the AEGIS system. Utilization of the Micropolis disk system as a software development storage media will free the REMEX Data Warehouse for storage of radar data to emulate the SPY-1A radar. GRA

N84-13863# Los Alamos Scientific Lab., N. Mex.
NETWORK FILE-STORAGE SYSTEM
M. W. Collins, Marjorie J. Devaney, and Emily W. Willbanks 1983 10 p Presented at the 3rd Ann. Computer User's Conf. of the Natl. Center for Atmospheric Res., Boulder, Colo., 20-21 Sep. 1983
(Contract W-7405-eng-36)
(DE84-001068; LA-UR-83-2678; CONF-8309165-1) Avail: NTIS HC A02/MF A01

The Central File System (CFS) is a file management and file storage system for the Los Alamos National Laboratory's computer network. The CFS is organized as a hierarchical storage system: active files are stored on fast-access storage devices; larger, less active files are stored on slower, less expensive devices; and archival files are stored offline. Files are automatically moved between the various classes of storage by a file magration program that analyzes file activity, file size and storage device capabilities. This has resulted in a cost-effective system that provides both fast access and large data storage capability. DOE

N84-13864# Argonne National Lab., Ill.
CEREAS: AN INTERACTIVE COMPUTER-MAPPING SYSTEM FOR ENVIRONMENTAL ASSESSMENTS
James B. Levenson and Mary A. Snider 1983 16 p refs Presented at Energy Resource Management '83, San Francisco, 23 Aug. 1983
(Contract W-31-109-eng-38)
(DE83-017927; CONF-830847-1) Avail: NTIS HC A02/MF A01

The CEREAS (Categorical Exclusion Review/Environmental Assessment System) provides the environmental scientist with the tools needed to quickly process an application for permit to drill (APD). It provides an interactive referencing system for producing maps of potential constraint areas surrounding oil and gas activity sites. The design of the system makes it highly flexible. The CEREAS was specifically developed to support the CER procedure in processing APDs for oil and gas in the western overthrust belt. It should be emphasized, however, that the system is not limited by geographic boundaries, CER criteria, or oil and gas activities. Of the three system components, only the mapping program remains constant. The command processor and data bases are necessarily project-specific, contributing to the overall system flexibility. Any geographic data potentially defined by longitude/latitude coordinates can be designated as a data base. The CEREAS is basically a graphic data retrieval system. DOE

N84-13865# California Univ., Livermore. Lawrence Livermore Lab. Control System Development Group.
DETAILED INTRODUCTION AND REFERENCE MANUAL FOR: THE NETWORK-SHARED-MEMORY DISTRIBUTED DATABASE SYSTEM
James M. Duffy, John R. Hill, and David L. McGuigan 5 Aug. 1983 88 p
(Contract W-7405-eng-48)
(DE83-017547; UCID-30195) Avail: NTIS HC A05/MF A01

Network shared memory (NSM) is a utility by which application programs residing on any computer in a network may share tables of information in a manner that is similar to a shared memory connection. It was developed for the control system of Nova High Energy Laser Facility. The network shared memory package provides a uniform data access interface between programs on the same computer or on separate computers connected by either multiport memory or high speed network links. Network shared memory is actually a large collection of data tables that can be accessed by any program on any computer in the control system. Called REGIONS, these named tables are the basic addressable elements of shared data. In the Nova application, regions contain control or status information for control system components, but they are general enough to contain any kind of shared information for control system components, but they are general enough to contain any kind of shared information. User calls provided by NSM allow programs to map regions into their data space, gain exclusive access to the regions, and signal other programs that the data has been modified, and wait for such signals. The NSM has extended the usefulness of the network software by providing a user interface that allows the control system engineer access to a distributed computer system by specifying the control function involved rather than the network activity required. DOE

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N84-13866*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
KINEMATIC EQUATIONS FOR RESOLVED-RATE CONTROL OF AN INDUSTRIAL ROBOT ARM
L. Keith Barker Nov. 1983 37 p refs
(NASA-TM-85685; NAS 1.15:85685) Avail: NTIS HC A03/MF A01 CSCL 05H

An operator can use kinematic, resolved-rate equations to dynamically control a robot arm by watching its response to commanded inputs. Known resolved-rate equations for the control of a particular six-degree-of-freedom industrial robot arm and proceeds to simplify the equations for faster computations are derived. Methods for controlling the robot arm in regions which

normally cause mathematical singularities in the resolved-rate equations are discussed. Author

N84-13867# Naval Postgraduate School, Monterey, Calif.
ARTIFICIAL INTELLIGENCE TECHNIQUES FOR INDUSTRIAL APPLICATIONS IN JOB SHOP SCHEDULING M.S. Thesis
Wade Benton Townsend Jun. 1983 48 p
(AD-A132164; AD-E850405) Avail: NTIS HC A03/MF A01 CSCL 09/2

The application of AI (artificial intelligence) techniques to the scheduling of industrial production operations offers a promising new approach to a scheduling problem of great magnitude and complexity. Foremost among these techniques is a powerful knowledge representation language that is capable of modeling the production environment at all levels of detail. The capturing of such complexity in the data base enables the computer to generate feasible schedules from a very large solution space which are highly rated by human experts. An introduction to artificial intelligence is presented that discusses knowledge representation techniques and describes an intelligent scheduling system. The relevance of AI techniques to military industrial production operations is explored by examining the closed job shop in the contest of jet engine repair. GRA

N84-13868# California Univ., Livermore. Lawrence Livermore Lab. Mechanical Engineering Dept.
INTRODUCTION TO FLEXIBLE MANUFACTURING SYSTEMS: THEIR APPLICATIONS, CLASSIFICATION, AND OPPORTUNITIES
George P. Sutton 20 Sep. 1983 31 p Presented at the Flexible Manuf. Systems-West Seminar, Anaheim, Calif., 20 Sep. 1983
(Contract W-7405-eng-48)
(DE83-017373; UCRL-89746; CONF-8309159-1) Avail: NTIS HC A03/MF A01

A Flexible Manufacturing System (FMS) is an automatic manufacturing system consisting of several types of automated fabrication equipment and a common material handling system, supervised by a common computer and designed to randomly manufacture or assemble products belonging to a common part family. The FMSS are essentially limited in their applications to discrete assembly of components, or the manufacture and inspection of hard goods. The FMS grouping can be classified in various ways into modules, cells or work cells, and more complex systems. Two kinds of opportunities are discussed: the opportunity to design and acquire an FMS so it gives the maximum benefits to the user, and the opportunities for the FMS builders to take advantage of a growing market. DOE

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N84-13869 State Univ. of New York, Stony Brook.
ON INTERPOLATION METHODS FOR BOUNDARY VALUE ORDINARY DIFFERENTIAL EQUATIONS Ph.D. Thesis
Suchitra Gupta 1983 70 p
Avail: Univ. Microfilms Order No. DA8315091

By introducing interpolated values in each subinterval, it is shown that the accuracy of finite difference (Gap and Overhang) methods can be increased significantly when solving two-point boundary value ordinary differential equations. Two families of box schemes which are based on this technique are developed. The first of these uses interpolated values at the middle point of each subinterval. They are called Three Point Box Schemes, because these schemes use values at the three points of each subinterval--the two end points and the middle point. The second family of schemes uses interpolated values at the three intermediate points of each subinterval (Five Point Box Schemes). The storage requirements are the same as for the usual Gap schemes (e.g., Trapezoidal rule, Corrected Trapezoidal rule, etc.), but the accuracy is improved by two and four orders in the case of Three Point Schemes and Five Point Schemes, respectively. Since the asymptotic error expansions for Three Point Schemes contain even order terms only, Richardson extrapolation can be employed to get higher accuracy with relatively few computations. Dissert. Abstr.

N84-13870 Virginia Polytechnic Inst. and State Univ., Blacksburg.
SOLUTION OF THE 2-POINT BOUNDARY VALUE PROBLEMS OF OPTIMAL SPACECRAFT ROTATIONAL MANEUVERS Ph.D. Thesis
Srinivas Rao Vadali 1982 104 p
Avail: Univ. Microfilms Order No. DA8316904

Numerical schemes for the solution of two-point boundary value problems arising from the application of optimal control theory to mathematical models of dynamic systems, are discussed. Optimal control problems are formulated for rotational maneuvers of multiple rigid body, asymmetric spacecraft configurations with both external torques and/or toruqes. Necessary conditions for optimality are derived through Pontragin's principle; solutions to the problems are obtained numerically. Comparison studies using competing numerical methods and various choices of performance indices are reported. Dissert. Abstr.

N84-13871# National Aerospace Lab., Tokyo (Japan).
SOME GRID GENERATIONS USING CONFORMAL MAPPING
Takashi Nakamura and Kenji Inoue 1983 11 p refs In JAPANESE; ENGLISH summary
(NAL-TR-758; ISSN-0089-4010) Avail: NTIS HC A02/MF A01

Numerical methods are proposed for determining the transformation functions which map (1) the domain on the x + iy = z-plane bounded by two periodic functions y1 (X) and y2 (X) with a common period L onto an infinite strip -p </=eta <= p on xi + i(eta)= zeta-plane and (2) the semi-infinite domain on the z-plane bounded by a periodic function y1 (X) onto the half zeta-plane eta < = 0. These methods are also applicable to the conformal mapping of (3) the doubly connected region bounded by two concentric closed curves and (4) regions exterior or interior to a closed curve. Author

N84-13872# National Aerospace Lab., Tokyo (Japan).
GRID GENERATION FOR CASCADES USING CONFORMAL MAPPING
Kenji Inoue 1983 10 p refs In JAPANESE; ENGLISH summary
(NAL-TR-760; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

A method of grid generation for cascades using conformal mapping is proposed. In this method, the transformation function which maps the domain of two periods of the cascades onto a rectangular region is determined numerically. The method can be applied to cases of high solidity. Once a fundamental O-type grid is obtained, either an H-type grid or grids of C-type can be generated through it. Author

N84-13873# Georgia Univ., Athens. Dept. of Statistics and Computer Sciences.
SPLINES AND THE GALERKIN METHOD FOR SOLVING THE INTEGRAL EQUATIONS OF SCATTERING THEORY
M. Brannigan and D. Eyre (National Research Inst. for Mathematical Sciences, Pretoria) Jun. 1982 31 p refs
(CSIR-TWISK-267) Avail: NTIS HC A03/MF A01

The use of the Galerkin method with cubic B spline approximants to solve singular integral equations that arise in scattering theory is discussed. The relationship between the Galerkin and collocation methods is stressed. The error bound for cubic spline approximates has a convergence rate of O(h(4)) where h is the mesh spacing. The utility of the Galerkin method is tested by solving both two and three body problems. By solving the Amado-Lovelace equation for a system of three identical bosons, it is demonstrated that the numerical treatment of the scattering problem is both efficient and accurate for small linear systems. M.G.

N84-13874# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
INTERACTING WEIGHTS IN MULTIPLE ATTRIBUTE DECISION MAKING
B. Mond (La Trobe Univ.) and E. E. Rosinger Jul. 1982 17 p refs
(CSIR-TWISK-270) Avail: NTIS HC A02/MF A01

A weight assessing method is given for solving a multiple attribute decision problem involving one decision maker. The method gives significant freedom and ease to the decision maker who is asked only to specify certain groups of attributes and the corresponding joint weights. The method then provides for a sophisticated interaction between various levels of the attributes involved. Furthermore, if the decision maker wishes to give additional information of the above mentioned kind, he/she establishes an interaction on the level of the solution process. This can compensate for the inherent limitations of any method based on scalar utility functions by bringing back a certain intransitivity and incomparability of preferences, which are natural in multiple attribute situations. M.G.

N84-13875# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
THE LINEAR HIERARCHICAL MODEL AND ITS APPLICATION IN THE ECONOMETRIC ANALYSIS
Y. Haitovsky (Hebrew Univ., Jerusalem) Aug. 1982 37 p refs
(CSIR-TWISK-274) Avail: NTIS HC A03/MF A01

Many econometric models involve different levels of relationships among variables and/or observation units. For example, a random coefficients specification using panel data essentially utilizes time-series data on the micro units to estimate regression parameters for each micro-model. Then, the micromodels are tied together by the assumption that the respective micro-coefficients average to yield a set of common coefficients. The Linear Hierarchical Model (LHM), which was originally devised as a Bayesian alternative to least-squares estimates of the linear model by allowing specification of prior structure on the model parameters in a form of a linear model, can be used to estimate the model with different levels of relationships. M.G.

N84-13876# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
GENERALIZED COMPOSITE INTEGRATION RULES IN THE PRESENCE OF A SINGULARITY
P. Rabinowitz (Weizmann Inst. of Science) Jul. 1982 11 p refs
(CSIR-TWISK-272) Avail: NTIS HC A02/MF A01

A composite integration rule results from applying a basic integration rule exact for constants and with all abcissas in the integration interval to each of n equal subintervals of the interval of integration. A sequence of such composite rules converges to the integral for all Riemann-integrable functions and for functions with an endpoint singularity which are dominated by a monotonic improperly integrable function. These rules are generalized to allow a partition into unequal subintervals or different basic rules in each subinterval. In each of these situations, restrictions must be placed on the basic rule or rules or on the partition to ensure convergence in the singular case. Such restrictions also ensure the convergence of a modified rule in the case of an interior singularity. Author

N84-13877# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
ESTIMATION OF THE MANOVA EIGENVALUES UNDER THE RANDOM EFFECTS MODEL
L. Paul Fatti Jul. 1982 30 p refs
(CSIR-TWISK-271) Avail: NTIS HC A03/MF A01

In multivariate analysis of variance or discriminant analysis under the random effects model, the between and within group sums of squares and cross products matrices A1 and A2 independent central Wishart distributions with parameter matrices sigma 1 and sigma 2, respectively. The eigenvalues gamma 1>gamma 2>...>gamma sub p of sigma 1 sigma 2(-1) are of interest in certain distributional problems, and in this paper methods of estimating them from the corresponding eigenvalues of A1 A2(-1) are considered. The various estimators proposed are compared by means of a simulation experiment. M.G.

N84-13878# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
A NUMEROV-GALERKIN TECHNIQUE APPLIED TO A FINITE ELEMENT SHALLOW-WATER EQUATIONS MODEL WITH ENFORCED CONSERVATION OF INTEGRAL INVARIANTS AND SELECTIVE LUMPING
I. M. Navon Sep. 1982 56 p refs
(CSIR-TWISK-276) Avail: NTIS HC A04/MF A01

A two-stage Numerov-Galerkin method is presented and applied, following a suggestion to achieve higher accuracy by combining the Galerkin product with a high-order compact (Numerov) difference approximation to derivatives in the nonlinear advection operator of the shallow-water equations. The practical applicability of the method is supported by computational examples involving medium (10 days) and long-term (20 days) integrations of the nonlinear shallow-water equations. Small scale noise was eliminated by periodical application of a Shuman filter to only one component of the velocity. Conservation of integral invariants is ensured by using an augmented Lagrangian multiplier-penalty method in the Numerov-Galerkin method. Experiments were performed using the method with differently weighted selected lumping schemes for the mass matrix. The method exhibits a consistently higher accuracy than the single-stage Galerkin method and requires much less computational effort. A hypothesis is offered to explain the increased accuracy obtained by selective lumping schemes in the long-term numerical integrations as compared to the consistent mass approach in Numerov-Galerkin schemes.M.G.

N84-13879# Aeronautical Research Labs., Melbourne (Australia).
INITIAL ESTIMATES OF DAMPING RATES AND FREQUENCIES
T. G. Ryall Mar. 1983 13 p ref
(ARL-STRUC-NOTE-485; AR-002-943) Avail: NTIS HC A02/MF A01

A simple, quick method for obtaining frequencies and damping ratios from Fourier transforms was devised. Single pole-single zer approximation, equation of Nyquist locus, and two zeros-two poles approximation are addressed. N.W.

N84-13880# Cape Town Univ. (South Africa). Dept. of Civil Engineering.
THE PLANE STRESS/STRAIN ANALYSIS OF NON-HOMOGENEOUS CONTINUA BY THE BOUNDARY INTEGRAL EQUATION METHOD
G. C. Howell and W. S. Doyle Jun. 1982 24 p refs
(TR-821S) Avail: NTIS HC A02/MF A01

The numerical analysis of non-homogeneous bodies by the boundary integral equation method (BIEM) is discussed. The body is divided into subregions where the material properties are constant, and each subregion is enclosed within its own boundary. Quadratic shape functions are used to interpolate the variables defined on these boundaries. At corners, either on the external boundaries or on the subregion interfaces, the tractions are discontinuous which can cause numerical difficulties. Particular attention is given to overcoming this problem by using either a set of auxiliary equations, or a number of auxiliary nodes at these corner points. In addition, the elegant method of calculating the body force terms by boundary integration, instead of the more conventional domain integration, is discussed. Finally, two examples are presented which examine the performance of the BIEM for problems of this type. M.G.

N84-13881# Cape Town Univ. (South Africa). Dept. of Civil Engineering.
NOSTRUM: A FINITE ELEMENT PROGRAM FOR NONLINEAR STRUCTURAL MECHANICS
T. B. Griffin May 1982 35 p refs
(TR-18) Avail: NTIS HC A03/MF A01

Nonlinear structural mechanics (NOSTRUM) is a finite element

program which uses an incremental solution procedure with equilibrium iteration to analyze the behavior of two dimensional plane problems in nonlinear stress analysis and structural mechanics. Several nonlinear material models were incorporated into the program, including granular and incompressible materials. Nonlinear geometrical effects are also incorporated, using an updated Lagrangian technique. Frictional sliding and loss of contact on rigid straight boundaries can be taken into account. The element library includes 4, 8 and 9 - noded isoparametric finte and infinite elements. The fundamental mechanical concepts used in the program and its capabilities are described. M.G.

N84-13882# Orange Free State Univ., Bloemfontein (South Africa). Dept. of Mathematical Statistics.
VARIOUS SOLUTIONS IN MULTIPLE BAYESIAN'S DECISION AND MULTINORMAL ESTIMATION PROBLEMS M.S. Thesis
I. Garisch Apr. 1982 55 p refs Sponsored in part by CSIR
(TR-78) Avail: NTIS HC A04/MF A01

Various solutions of a multi-Bayesian decision problem are considered as a co-operative n-person non zero-sum game. Special emphasis is placed on the case of n=2 Bayesians. the non-symmetric Nash solution is illustrated in examplee. Solutions in multiple Bayesian's decision problems and solutions for multi-Bayes estimates of the multinormal mean are considered. N.W.

N84-13883# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
USE OF AN EXACT PENALTY FUNCTION FOR OPTIMIZATION OF DISCRETE PROBLEMS [USO DE UMA FUNCAO DE PENALIDADE EXATA PARA OTIMIZACAO EM PROBLEMAS DISCRETOS]
Luiz Antonio Nogueira Lorena Jun. 1983 19 p refs In PORTUGUESE; ENGLISH summary Presented at the 26th Brazilian Operations Res. Symp., Florianopolis, Brazil, Oct. 1983
(INPE-2769-PRE/342) Avail: NTIS HC A02/MF A01

The use of an exact penalty function is suggested for problems like (PD) min [f(x):g(x)< or = 0, x is a member of XCR(n), in which f:R(n) approaches R,g:R(n) and X = X(1),..., X(t)], t < infinity, t is a member of N. The general duality theory is studied, where the Lagrange multipliers are replaced by functions, with the objective of avoiding the duality gap, a usual problem in nonlinear programming. The existence conditions of the penalty function for the problem (PD) are derived from duality theory, and a superior estimate for the penalty term is obtained. The penalty problem is difficult to solve, because its objective function is nondifferentiable. It is suggested that an equivalent problem, the dual problem of (PD), be solved by the subgradient method. A simple example of zero-one integer programming is shown. Primal optimality is guaranteed by the dual optimization, even in the case where the complementary slackness condition fails. M.G.

N84-13884# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF THE OPTIMAL CONTROL PROBLEM SOLVING IN THE BOLZA FORM BY THE FINITE ELEMENT METHOD [ESTUDO DA SOLUCAO DE PROBLEMAS DE CONTROLE OTIMO NA FORMA DE BOLZA PELO METODO DOS ELEMENTOS FINITOS]
Santiago Alves Tavares and Ricardo Luiz Utsch deFreitas Pinto May 1983 14 p refs In PORTUGUESE; ENGLISH summary Presented at the 7th Brazilian Mech. Eng. Congr. COBEM '83, Uberlandia, Brazil, 13-16 Dec. 1983
(INPE-2750-PRE/326) Avail: NTIS HC A02/MF A01

The application of the finite element method to the optimal control problem in the Bolza form is discussed. The problem is solved as an optimization problem with an objective functional and constraints. The concepts of finite element methods were applied, and the solution parameters were obtained by means of a weighted residual method (Galerkin). It was then transformed to a mathematical programming problem and solved jointly by conjugate gradient and gradient projection methods. M.G.

N84-13885*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ACCELERATION OF CONVERGENCE OF VECTOR SEQUENCES
Avram Sidi, William F. Ford, and David A. Smith (Duke Univ., Durham, N.C.) Dec. 1983 27 p refs
(Contract NAS3-23606; Grant NsG-3160)
(NASA-TP-2193; E-1719; NAS 1.60:2193) Avail: NTIS HC A03/MF A01 CSCL 12A

A general approach to the construction of convergence acceleration methods for vector sequence is proposed. Using this approach, one can generate some known methods, such as the minimal polynomial extrapolation, the reduced rank extrapolation, and the topological epsilon algorithm, and also some new ones. Some of the new methods are easier to implement than the known methods and are observed to have similar numerical properties. The convergence analysis of these new methods is carried out, and it is shown that they are especially suitable for accelerating the convergence of vector sequences that are obtained when one solves linear systems of equations iteratively. A stability analysis is also given, and numerical examples are provided. The convergence and stability properties of the topological epsilon algorithm are likewise given. Author

N84-13886*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SOLUTION OF POISSON EQUATIONS FOR 3-DIMENSIONAL GRID GENERATIONS
K. Fujii Oct. 1983 25 p refs
(NASA-TM-85857; A-9527; NAS 1.15:85857) Avail: NTIS HC A02/MF A01 CSCL 12A

A method for generating three dimensional, finite difference grids about complicated geometries by using Poisson equations is developed. The inhomogenous terms are automatically chosen such that orthogonality and spacing restrictions at the body surface are satisfied. Spherical variables are used to avoid the axis singularity, and an alternating-direction-implicit (ADI) solution scheme is used to accelerat the computations. Computed results are presented that show the capability of the method. Since most of the results presented have been used as grids for flow-field computations, this is indicative that the method is a useful tool for generating three-dimensional grids about complicated geometries. Author

N84-13887# Massachusetts Inst. of Tech., Cambridge. Statistics Center.
ADAPTIVE SPECTRAL SMOOTHING
Fernando Tusell Palmer Aug. 1983 21 p
(Contract N00014-75-C-0555)
(AD-A132574; TR-30) Avail: NTIS HC A02/MF A01 CSCL 12/1

A nonparametric, adaptive smoother for the periodogram is proposed, with a view to its application in linear prediction. Its performance is compared to several other existing methods, parametric and nonparametric, adaptive and non adaptive, of spectral estimation. The comparison is made in terms of prediction error. Author (GRA)

N84-13888# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
GREAT SPHERE FIBRATIONS OF MANIFOLDS Ph.D. Thesis
John Petro 1983 123 p
(AD-A132544; AFIT/CI/NR-83-27D) Avail: NTIS HC A06/MF A01 CSCL 12/1

There are three questions that guide our study: (1) given two fibrations are they topologically equivalent, (2) is it possible to deform one fibration to another through a one parameter family of fibrations, and (3) what is the homotopy type of the space of all fibrations? We address these questions for great circle fibrations of odd dimensional round spheres and arbitrary great k-sphere fibrations. GRA

N84-13889# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.

PLY: A SYSTEM OF PLAUSIBILITY INFERENCE WITH A PROBABILISTIC BASIS
Alexander Yeh Dec. 1982 28 p
(Contract N00014-75-C-0661)
(AD-A132537; MIT/LCS/TM-232) Avail: NTIS HC A03/MF A01 CSCL 12/1

An overview is given of a system of plausibility inference that will be developed for use in planning. This system, to be called PLY, will be specifically designed to work with propositions of the form when A is true (occurs), B is likely to be true (to occur). Previous systems performing similar functions have been designed as aids for such tasks as medical diagnosis (MYCIN and others) and mineral prospecting (PROSPECTOR). PLY will have a probabilistic basis. Intuitive assumptions to deal with knowledge not explicitly given to the system will be made with the aid of an information-theoretic measure on the amount of information in a probability distribution. Unlike many other systems, PLY will not use these assumptions when the given knowledge indicates they are not tenable. In addition to standard probabilities, PLY will be able to make use of knowledge (information) in the form of the correlations and increased/decreased likelihoods, which most people find easier to estimate than probabilities. PLY's knowledge will be in an organized and structured form, which will help in knowledge acquisition and revision, facilitate system explanations, and lower the storage requirements of the system. Author (GRA)

N84-13890# Rochester Univ., N. Y. Dept. of Computer Science.
ADVANCED HOUGH TRANSFORM IMPLEMENTATIONS
C. M. Brown, M. B. Curtiss, and D. B. Sher Mar. 1983 16 p
(Contracts N00014-82-K-0193; N00014-80-C-0197; N00014-78-C-0164)
(AD-A132522; TR-113) Avail: NTIS HC A02/MF A01 CSCL 12/1

In the Hough transform, a feature in an input space I votes for parameters in a transform space P with which it is compatible. It it also uses negative votes to vote against parameters with which it is incompatible, background bias and inherent noise in P can be reduced and peaks sharpened. In the usual Hough transform implementation, an array is used to accumulate votes, raising the problem that the space requirement increases exponentially with the number of parameters. Accumulation in a fixed-size content-addressable cache (or hash table) may provide a solution. Author

N84-13891# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
CONCURRENCY CONTROL FOR RESILIENT NESTED TRANSACTIONS
Nancy A. Lynch Feb. 1983 33 p
(Contracts N00014-75-C-0661; N00014-83-K-0125; NR Proj. 049-189)
(AD-A132501; MIT/LCS/TR-285) Avail: NTIS HC A03/MF A01 CSCL 12/1

A formal framework is developed for providing correctness of algorithms which implement nested transactions. In particular, a simple action tree data structure is defined, which describes the ancestor relationships among executing transactions and also describes the views which different transactions have of the data. A generalization of serializability to the domain of nested transactions with failures is defined. A characterization is given for this generalization of serializability, in terms of absence of cycles in an appropriate dependency relation on transactions. A slightly simplified version of Moss' locking algorithm is presented in detail, and a careful correctness proof is given. The style of correctness proof appears to be quite interesting in its own right. The description of the algorithm, from its initial specification to its detailed implementation, is presented as a series of event state algebra levels, each of which simulates the previous one in a straightforward way. Author (GRA)

N84-13892# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
ON BISECTING RANDOM GRAPHS
Thang Nguyen Bui Feb. 1983 43 p
(Contract N00014-80-C-0622; NR Proj. 048-667)
(AD-A132500; MIT/LCS/TR-287) Avail: NTIS HC A03/MF A01 CSCL 12/1

A bisection of a graph with an even number of vertices is a partition of the vertex set into two disjoint sets of equal size is outlined. Given a bisection, the number of edges having one end in each of the two subsets of the bisection is called the size of the bisection. The bisection size of a graph is the minimum size of all possible bisections of the graph. Given a graph with an even number of vertices and a positive integer, the graph bisection problem is the problem of determining if the bisection size of the graph is less than the given number. The graph bisection problem is known to be NP-hard. In this thesis, we give probabilistic lower bounds and upper bounds for the bisection size of random graphs, graphs in which an edge appears between any two vertices with a certain fixed probability, say-p, independent of all other edges. Upper bound and lower bound on the bisection size are given in the case-p is a function of n. We also consider some heuristics for solving the graph bisection problem. GRA

N84-13893# Army Electronics Research and Development Command, White Sands Missile Range, N. Mex. Electronic Warfare Lab.
CURVE FIT TECHNIQUE FOR A SMOOTH CURVE USING GAUSSIAN SECTIONS
Ryan Moats Aug. 1983 11 p
(DA Proj. 1L1-62715-A-042)
(AD-A132499; DELEW-TR-83-2) Avail: NTIS HC A02/MF A01 CSCL 12/1

This report describes the development of a general algorithm that is easily programmable on either a small desk-top computer or calculator and can curve fit any number of points into smooth Gaussian sections for statistical analysis. Author (GRA)

N84-13894# Oregon Univ., Eugene. Dept. of Physics.
LIOUVILLIAN GREEN'S-FUNCTION THEORY OF SPECTRAL LINE SHAPE
M. D. Girardeau and C. F. Hart Aug. 1983 28 p Repr. from Phys. Rev. A, v. 28, no. 2, Aug. 1983 p 1072-1097
(Contract N00014-81-K-0759; NR Proj. 394-055)
(AD-A132467; QFT-7) Avail: NTIS HC A03/MF A01 CSCL 12/1

The general method of report QFT-6 is illustrated by calculation of the transition energy shift and width for the two-level atom interacting with an equilibrium or nonequilibrium bath. A general theory of time-dependent power radiated by a decaying excitation is developed and illustrated by application to the same model. Author

N84-13895# Naval Underwater Systems Center, New London, Conn.
MATHEMATICAL MODELS OF NONLINEAR GALVANIC POLARIZATION Interim Report
Rolf G. Kasper and Michael O. Duffy 16 Aug. 1983 32 p
(NR Proj. 036-163; RR014110B; RR0220801)
(AD-A132403; NUSC-TR-6921) Avail: NTIS HC A03/MF A01 CSCL 12/1

The basic differential equation governing the conductive-current flow in an electrical continuum is analogous to the general heat-conduction equation. A series of simple steady-state electrochemical models were created using the COSMIC/NASTRAN finite-element program. The purpose of this study is to observe the behavior, physically and mathematically, of convective membrane boundary elements when assigned a nonlinear current-flow capability with respect to the local surface electric potential. Nodal potentials and current flows for a variety of boundary conditions and model configurations are given and modeling conclusions based on this analysis are presented. Author (GRA)

N84-13896# Naval Research Lab., Washington, D. C. Computer Science and Systems Branch.
MULTISIGNAL MINIMUM-CROSS-ENTROPY SPECTRUM

ANALYSIS WEIGHTED PRIORS Interim Report
Rodney W. Johnson and John Shore 27 Jul. 1983 16 p (RR0210542)
(AD-A132358; AD-E000541; NRL-8731) Avail: NTIS HC A02/MF A01 CSCL 12/1

This report presents a generalization of multisignal minimum cross entropy spectrum analysis (multisignal MCESA), a method for simultaneously estimating a number of power spectra when a prior estimate of each is available and new information is obtained in the form of values of the autocorrelation function of their sum. The generalization involves attaching to each prior spectrum estimate a frequency dependent weighting parameter that indicates its relative reliability, or the relative degree of belief associated with it. Mathematical properties of the generalized method are discussed, and illustrative numerical examples are given. GRA

N84-13897# Northwestern Univ., Evanston, Ill. Dept. of Materials Science.
THE MEASUREMENT OF ELASTIC CONSTANTS FOR THE DETERMINATION OF STRESSES BY X-RAYS
K. Perry, I. C. Noyan, P. J. Rudnik, and J. B. Cohen 29 Jul. 1983 16 p
(Contract N00014-80-C-0116; Grant NSF DMR-82-16972)
(AD-A132330; AD-F630051; TR-11) Avail: NTIS HC A02/MF A01 CSCL 12/1

The equations for errors in the measurement of X-ray elastic constants are derived. An automated device for measuring these has been developed and tested. GRA

N84-13898# California Univ., Berkeley. Dept. of Industrial Engineering and Operations Research.
USING SIMULATION TO ESTIMATE FIRST PASSAGE DISTRIBUTIONS
Sheldon M. Ross and Zvi Schechner (Columbia Univ.) Jan. 1983 25 p
(Grant AF-AFOSR-0122-81; AF Proj. 2304)
(AD-A132328; AD-F630051; ORC-83-1) Avail: NTIS HC A02/MF A01 CSCL 12/1

Consider a discrete time Markov process (X sub n, n > or = 0). For a given subset A of the state space consider the problem of using simulation to estimate the number of transitions it takes the process to enter A. Using estimators based on the 'observed hazard', we are able to improve on the usual Monte Carlo estimator. We also consider the problem of estimating the distribution of the first state in A to be reached, and then extend our results to continuous time. GRA

N84-13899# Naval Oceanographic Office, Bay St. Louis, Miss. Advanced Technology Staff.
MULTIVARIATE, MINIMUM-CURVATURE SPLINES FOR RANDOMLY SPACED DATA Final Report
James R. Cloutier Jul. 1983 82 p
(AD-A132319; NOO-TR-270) Avail: NTIS HC A05/MF A01 CSCL 12/1

This paper develops a collection of multivariate splines which are applicable to randomly spaced data. The splines are constructed from a linear combination of spline basis functions having evenly spaced nodes. A pseudoinverse solution of coefficients is obtained via a singular value decomposition (SVD). Spurious oscillations are damped by zeroing out an appropriate number of the singular values. A transformation is performed prior to entering the SVD so that, whenever the solution is nonunique, the 'minimum-curvature' solution is obtained. An added feature of these splines is an option through which a periodic fit may be produced in one or more dimensions if it is so desired. Author (GRA)

N84-13900# Texas A&M Univ., College Station. Dept. of Statistics.
TIME SERIES LONG MEMORY IDENTIFICATION AND QUANTILE SPECTRAL ANALYSIS
Emanuel Parzen Aug. 1983 37 p
(Contract DAAG29-83-K-0051)
(AD-A132240; TR-A-23; ARO-20140.6-MA) Avail: NTIS HC A03/MF A01 CSCL 12/1

An approach to spectral estimation is described which involves the simultaneous use of frequency, time, and quantile domain algorithms, and is called quantile spectral analysis. It is based on the premise that while the spectrum is a nonparametric concept, its estimation cannot be a nonparametric procedure to be conducted independently of model identification. We discuss: the goals of spectral analysis, quantile data analysis, identification of memory (no, short, long), index of regular variation of a spectral density, autoregressive spectral estimation, and ARMA model identification by estimating MA (infinity) and subset regression. An illustrative example is given of quantile spectral analysis.
Author (GRA)

N84-13901# Los Alamos Scientific Lab., N. Mex. Center for Nonlinear Studies.
REMARKS ON THE KURAMOTO-SIVASHINSKY EQUATION
Basil Nicolaenko and Bruno Scheurer (Univ. Paris-Sud) 1983 9 p refs Presented at the Fronts, Interfaces and Patterns Conf., Los Alamos, N. Mex., 2 May 1983
(Contract W-7405-eng-36)
(DE84-001018; LA-UR-83-2862; CONF-8305110-3) Avail: NTIS HC A02/MF A01

The analytical study of a fourth order nonlinear evolution equation is discussed. This equation was obtained by Sivashinsky in the context of combustion and independently by Kuramoto in the context of reaction diffusion systems. Both were motivated by the (nonlinear) stability of travelling waves. Numerical calculations were done on this equation. All the results seem to indicate a chaotic behavior of the solution. Therefore, the analytical study is of interest in analogy with the Burger's and Navier-Stokes equations. Some existence and uniqueness results for the equation in space dimension one, and a fractional step method of numerical resolution are discussed. DOE

N84-13902# California Univ., Livermore. Lawrence Livermore Lab.
APPLICATION OF THE IMPLICIT FOURIER-EXPANSION METHOD TO THE CALCULATION OF THREE-DIMENSIONAL EQUILIBRIA BY THE ITERATIVE METHOD
Aleksei I. Shestakov Aug. 1983 22 p refs Presented at the 2nd European Workshop on Computational Probl. in the Calculations of MHD Equilibria, Wildhaus, Switzerland, 12-14 Sep. 1983
(Contract W-7405-eng-48)
(DE83-017621; UCRL-89752; CONF-8309137-2) Avail: NTIS HC A02/MF A01

The iterative method of finding solutions to three dimensional equilibria is discussed. The implicit Fourier-expansion method is briefly described and applied to the linear problems arising in the iterative loops. How to efficiently solve for the magnetic field induced by the plasma is shown. DOE

N84-13406*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VLSI ARCHITECTURES FOR COMPUTING MULTIPLICATIONS AND INVERSES IN GF(2-m)
C. C. Wang, T. K. Truong, H. M. Shao, L. J. Deutsch, J. K. Omura (California Univ., Los Angeles), and I. S. Reed (Univ. of Southern California) *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 52-64 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 12A

N84-13784 Salzburg Univ. (Austria) Dept. of Mathematics.
ON SOME EXTENSIONS OF A THEOREM OF HARDY AND LITTLEWOOD
H. Stegbuchner *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 113-117 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13785 Helsinki Univ. (Finland). Dept. of Mathematics.
ON THE GROWTH OF THE SPHERICAL DERIVATIVE OF A

MEROMORPHIC FUNCTION
Sakarai Toppila *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 119-139 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13786 California Univ., Los Angeles. Dept. of Mathematics.
POSITIVE BIHARMONIC FUNCTIONS
Brad Beaver, Leo Sario, and Cecilia Wang *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 141-146 refs Prepared in cooperation with Arizona State Univ., Tempe (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13787 Purdue Univ., Lafayette, Ind. Dept. of Mathematics.
ON THE SINGULARITIES OF CERTAIN NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS
Patricio Aviles and Allen Weitsman *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 147-156 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13788 Indian Inst. of Tech., Madras. Dept. of Mathematics.
ON THE FATOU SET OF MONIC POLYNOMIALS
P. Bhattacharyya and Y. E. Arumaraj *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 157-163 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13789 Helsinki Univ. (Finland). Dept. of Mathematics.
ON THE RANGE OF REAL COEFFICIENTS OF FUNCTIONS WITH BOUNDED BOUNDARY ROTATION
Heikki Haario *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 165-176 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13790 Karlsruhe Univ. (West Germany). Inst. Mathematisches.
THE SPECIFIC SOLUTIONS OF A UNIFORM ALGEBRAIC DIFFERENTIAL EQUATION OF THE SECOND ORDER [UEBER DIE EINDEUTIGEN LOESUNGEN EINER HOMOGENEN ALGEBRAISCHEN DIFFERENTIALGLEICHUNG ZWEITER ORDNUNG]
Norbert Steinmetz *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 179-188 refs In GERMAN (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13791 Institute for Advanced Study, Princeton, N.J. School of Mathematics.
ON THE STRUCTURE OF SELF-SIMILAR FRACTALS
Pertti Mattila *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 189-195 refs Prepared in cooperation with Helsinki Univ., Finland (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13793 Helsinki Univ. (Finland). Dept. of Mathematics.
ON THE ORDER OF QUASIREGULAR MAPPINGS
S. Rickman and M. Vuorinen *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 221-231 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13796 Helsinki Univ. (Finland). Dept. of Mathematics.
ON THE HARNACK CONSTANT AND THE BOUNDARY BEHAVIOR OF HARNACK FUNCTIONS
Matti Vuorinen *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 259-277 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13797 Jyvaskyla Univ. (Finland). Dept. of Mathematics.
ON QUASI-PARABOLIC PROBLEMS WITH NORMAL BOUNDARY CONDITIONS
Veikko T. Purmonen *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 279-290 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13799 Warsaw Univ. (Poland). Dept. of Mathematics.
ON L SUP p-INTEGRABILITY IN PDE'S AND QUASIREGULAR MAPPINGS FOR LARGE EXPONENTS
Tadeusz Iwaniec *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 301-322 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13802 Tokyo Metropolitan Univ. (Japan). Dept. of Mathematics.
FUNCTIONS OF UNIFORMLY BOUNDED CHARACTERISTIC
Shinji Yamashita *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 349-367 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13803 Oxford Univ. (England). Mathematical Inst.
CONVOLUTION OF GENERALIZED VECTOR MEASURES
Olli Martikainen *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 369-382 refs Prepared in cooperation with Helsinki Univ. of Tech., Espoo, Finland (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13804 Martin Luther-Universitaet, Halle-Wittenberg (East Germany). Section Mathematik.
QUASICON FORMAL EXTENSIONS, FREDHOLM EIGENVALUES, AND GRUNSKY COEFFICIENT CONDITIONS [QUASIKONFORME FORTSETZBARKEIT, FREDHOLMSCHE EIGENWERTE UND GRUNSKYSCHE KOEFFIZIENTENBEDINGUNGEN]
Reiner Kuehnau *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 383-391 refs In GERMAN (For primary document see N84-13783 04-59)
Avail: Issuing Activity

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N84-13903# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
SELECTING A SUBSET OF REGRESSION VARIABLES SO AS TO MAXIMIZE THE PREDICTION ACCURACY AT A SPECIFIED POINT
Jacqueline S. Galpin and Douglas M. Hawkins Sep. 1982 24 p refs
(CSIR-TWISK-275) Avail: NTIS HC A02/MF A01

It is often desirable to select a subset of regression variables so as to maximize the accuracy of a prediction at a pre-specified point. It is shown that there are a variety of sensible criteria for such a prediction, and that these can easily be included in any stepwise regression code in which sweeping is used. The performance of the criteria is compared on a data set, where it becomes obvious that not only do different criteria give rise to different subsets at the same prediction point, but the same criterion can also give rise to different subsets at different prediction points.
M.G.

N84-13904# Orange Free State Univ., Bloemfontein (South Africa). Dept. of Mathematical Statistics.
A PREDICTIVE VIEW OF THE DETECTION OF INFLUENTIAL OBSERVATIONS IN GMANOVA
H. G. Luus, D. J. deWaal, and D. G. Nel Sep. 1982 13 p refs

(CSIR-TR-83) Avail: NTIS HC A02/MF A01

The detection of influential subsets of observations (possibly outliers) under the GMANOVA model is considered according to a technique with fairly discerning capabilities. Kullback-Leibler divergences are used to measure the discrepancy between two predictive densities, the one based on the complete data set and the other on a subset of the data set. Author

N84-13905# Orange Free State Univ., Bloemfontein (South Africa). Dept. of Mathematical Statistics.

ASYMPTOTIC NULL AND NONNULL DISTRIBUTIONS OF THREE MULTIVARIATE TEST STATISTICS IN GMANOVA

H. G. Luus and D. J. deWaal Sep. 1982 18 p refs

(TR-82) Avail: NTIS HC A02/MF A01

Asymptotic null and nonnull distributions of three test statistics for testing the rank of a matrix under the GMANOVA model are obtained. The statistics under consideration are the likelihood ratio criterion and the last few roots of the noncentral multivariate beta matrix of the first and of the second type respectively. The asymptotic null and nonnull distributions are given in terms of central chi(2) distributions and in terms of the standard normal distribution function and its derivatives respectively. M.G.

N84-13906# Stanford Univ., Calif. Dept. of Statistics.

THE AMPLITUDE DENSITY FUNCTION AND HIGH-RESOLUTION FREQUENCY ANALYSIS OF TIME SERIES

Alan Julian Izenman 6 Sep. 1983 67 p

(Contract N00014-76-C-0475)

(AD-A132466; SU-TR-337) Avail: NTIS HC A04/MF A01 CSCL 12/1

This paper describes the amplitude density function which is used to screen, identify and resolve frequencies in a time series. The technique is derived from the spectral representation of the sum of an harmonic regression function and a stochastic error process, and on the inversion theorem associated with that representation. The amplitude density function possesses the desirable properties of statistical consistency and high frequency resolution, and is related to the Fourier transform of a finite-length time series. Following the identification by the amplitude density function of the dominant frequencies in a time series, regression methods are used to fit a hidden periodicities model to the data. Also introduced is a high-resolution frequency trace to investigate the extent and direction of nonstationarity in a time series. These techniques are illustrated with a detailed frequency analysis of the annual sunspot numbers series from 1749 to 1979, and includes analysis of a physically motivated data transformation of the sunspot series. GRA

N84-13907# Oak Ridge National Lab., Tenn. Health and Safety Research Div.

ANALYSIS-PLOT GENERATION CODE WITH SIGNIFICANCE LEVELS COMPUTED USING KOLMOGOROV-SMIRNOV STATISTICS VALID FOR BOTH LARGE AND SMALL SAMPLES

S. E. Kurtz (Spring Arbor Coll., Mich.) and D. E. Fields Oct. 1983 66 p refs

(Contract W-7405-eng-26)

(DE84-001581; ORNL-5967) Avail: NTIS HC A04/MF A01

This report describes a version of the TERED/P computer code that is very useful for small data sets. A new algorithm for determining the Kolmogorov-Smirnov (KS) statistic is used to extend program applicability. The TERED/P code facilitates the anaysis of experimental data and assists the use in determining its probability distribution function. Graphical and numerical tests are performed interactively in accordance with the user's assumption of normally or log-normally distributed data. Statistical analysis options include computation of the chi-square statistic and the KS one-sample test statistic and the corresponding significance levels. Cumulative probability plots of the user's data are generated either via a local graphics terminal, a local line printer or character-oriented terminal, or a remote high-resolution graphics device such as the FR80 film plotter or the Calcomp paper plotter. Several useful computer methodologies suffer from limitations of their implementations of the KS nonparametric test. This test is one of the more powerful analysis tools for examining the validity of an assumption about the probability distribution of a set of data. DOE

N84-13908# Argonne National Lab., Ill.

AVERAGING PROCEDURES OF MULTIPHASE CONSERVATION EQUATIONS

W. T. Sha, B. T. Chao, and S. L. Soo 1983 9 p refs Presented at the Am. Nucl. Soc. Winter Meeting, San Francisco, 30 Oct. - 4 Nov. 1983 Prepared in cooperation with Illinois Univ., Urbana

(Contract W-31-109-eng-38)

(DE83-014698; CONF-831047-19) Avail: NTIS HC A02/MF A01

Averaging procedures are called for because of the probabilistic nature of interfaces of a multiphase system that alleviates solving a system of partial differential equations with multiple movable internal boundaries. The identity of dynamic phases is only preserved by local volume averaging first and only local volume averaging provides for the cumulative nature of thermodynamic properties. Subsequent time averaging determined the deviations of averages of product and product averages. These steps are necessary in arriving at conservation equations and the order of averaging should not be reversed. Time averaging will not only remove the distinction of dynamic phases, but also will give in general fraction of residence time of a phase rather than volume fraction of a phase. DOE

N84-13909# Oak Ridge National Lab., Tenn. Health and Safety Research Div.

ALGORITHM FOR COMPUTING SIGNIFICANCE LEVELS USING THE KOLMOGOROV-SMIRNOV STATISTIC AND VALID FOR BOTH LARGE AND SMALL SAMPLES

S. E. Kurtz (Spring Arbor Coll.) and D. E. Fields Oct. 1983 39 p refs

(Contract W-7405-eng-26)

(DE84-001586; ORNL-5819) Avail: NTIS HC A03/MF A01

The KSTEST code presented is designed to perform the Kolmogorov-Smirnov one-sample test. The code may be used as a stand-alone program or the principal subroutines may be excerpted and used to service other programs. The Kolmogorov-Smirnov one-sample test is a nonparametric goodness-of-fit test. A number of codes to perform this test are in existence, but they suffer from the inability to provide meaningful results in the case of small sample sizes (number of values less than or equal to 80). The KSTEST code overcomes this inadequacy by using two distinct algorithms. If the sample size is greater than 80, an asymptotic series developed by Smirnov is evaluated. If the sample size is 80 or less, a table of values generated by Birnbaum is referenced. Valid results can be obtained from KSTEST when the sample contains from 3 to 300 data points. The program was developed on a Digital Equipment Corporation PDP-10 computer using the FORTRAN-10 language. The code size is approximately 450 card images and the typical CPU execution time is 0.19 s. DOE

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N84-13910# Aeronautical Research Labs., Melbourne (Australia).

A SOLUTION TECHNIQUE FOR COMPLEX MATRIX GAMES

G. J. Murray Apr. 1983 10 p refs

(ARL-SYS-Note-83; AR-002-952) Avail: NTIS HC A02/MF A01

Mond and Murray introduced the concept of a zero sum two person game in complex space and proved two minimax theorems. A method is provided for the solution of such games. A numerical example is given. Author

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N84-13911 Clark Univ., Worcester, Mass.

SPLICE AND MALCEV ALGEBRAS Ph.D. Thesis

Habiba Abdallah El-Zohny 1983 40 p
Avail: Univ. Microfilms Order No. DA8313217

Let X be a compact, totally disconnected topological space X. Its base of clopens form a Boolean algebra, and let S be a sheaf over X. A splicing operation is defined: spL: B x F F approaches F where F is a set of all global sections. Abstract splice algebras satisfy five axioms. Given a splice algebra B, F one can construct a topological space S and a sheaf over X such that B and F arise as clopen sets of X and the set of global sections of X respectively. Also, special properties of Mal'cev algebras are discussed: (1) associative; (2) left and right distributive; (3) commutative; (4) abelian; (5) middle distributive. Mal'cev algebras which satisfy certain properties are constructed. They are in 1.1 correspondence (under certain conditions), and Mal'cev algebras based on Boolean algebras and Heyting algebras in linear and nonlinear cases are also discussed. Dissert. Abstr.

N84-13912 George Washington Univ., Washington, D.C.
INVARIANT MEANS ON SEMI-TOPOLOGICAL TRANSFORMATION SEMIGROUPS Ph.D. Thesis
Tyler Henry Haynes, Jr. 1983 97 p
Avail: Univ. Microfilms Order No. DA8311192

The objective is to find conditions which imply that a function space (algebra) is amendable (extremely amenable). If < S,X > is a tall-semigroup in which both S and X are endowed with the discrete topology, and if F is a linear space of bounded functions on X, then F is amenable if there are nets in the related i sub 1 (X)-space which converge to 0 in various topologies of i sub 1 (X). If in < S,X,F > F is an algebra, then subset Y of X is defined to be F,S which is X by certain conditions. Many alternative characterizations of F,S-thick are given. This concept is used in formulating conditions for the restriction of F to sub tau semigroup < T,Y > to be amenable. Necessary and sufficient conditions for F to be extremely amenable are also phrased in terms of thickness. Dissert. Abstr.

N84-13913# Tel-Aviv Univ. (Israel).
SOME DOUBLE-VALUED REPRESENTATIONS OF THE LINEAR GROUPS
Yuval Neeman Jan. 1983 27 p refs
(Contract DE-AS05-76ER-03992)
(DE84-001525; DOE/ER-03992/512) Avail: NTIS HC A03/MF A01

The mathematical theory of SL(n,R) and its double-covering group anti-SL(n,R), especially for n = 2, 3, 4, A is discussed. After discussing a variety of physical applications, it is shown that anti-SL(3,R) provides holonomic curved space (world) spinors with an infinite number of components. The relevant holonomic 'manifield' is constructed and the gravitational interaction of a proton is discussed as an example. DOE

N84-13792 Helsinki Univ. (Finland). Dept. of Mathematics.
QUASICONFORMAL SEMIFLOWS
Jukka Sarvas *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 197-219 refs Prepared in cooperation with Michigan Univ., Ann Arbor (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13794 Helsinki Univ. of Technology, Espoo (Finland). Inst. of Mathematics.
F-HARMONIC MEASURE IN SPACE
S. Granlund, P. Lindqvist, and O. Martio *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 233-247 refs Prepared in cooperation with Jyvaskyla Univ., Finland (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13795 Technische Univ., Berlin (West Germany). Fachbereich Mathematik.
ON FUCHSIAN GROUPS OF ACCESSIBLE TYPE
Ch. Pommerenke *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 249-258 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13798 Helsinki Univ. (Finland). Dept. of Mathematics.
REGULAR n-GONS AND FUCHSIAN GROUPS
Marjatta Naeaetaenen *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 291-300 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13800 Helsinki Univ. (Finland). Dept. of Mathematics.
TWISTED SUMS OF NUCLEAR FRECHET SPACES
Timo Ketonen and Kaisa Nyberg *In its* Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 323-335 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

N84-13801 Minnesota Univ., Minneapolis. School of Mathematics.
QUASICONFORMAL MAPPINGS WITH FREE BOUNDARY COMPONENTS
Richard Fehlmann *In* Helsinki Univ. Ann. of the Finn. Acad. of Sci., Ser. A, 1, Vol. 1 Aug. 1982 p 337-347 refs (For primary document see N84-13783 04-59)
Avail: Issuing Activity

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N84-13914 California Univ., Irvine.
TEST OF THE INVERSE SQUARE LAW OF GRAVITY AT DISTANCES OF 5 cm AND 1 m Ph.D. Thesis
John Kerry Hoskins 1983 136 p
Avail: Univ. Microfilms Order No. DA8313793

A preliminary test of the inverse square law of gravity at distances of about 1 m and 5 cm was completed. A torsion balance is used to compare the torque produced by (1) two 7 kg masses positioned 1 m from the torsion balance with (2) that produced by a 44 gm mass located 5 cm from one arm of the balance. Assuming a deviation in the inverse square law in which the gravitational constant G, would acquire a distance dependence of the form G(r) = G(sub0)(1 + epsilon/n r(cm)), we find Epsilon = (-1 + or - 3) x 10 to the minus 4th power in support of the inverse square law. Dissert. Abstr.

N84-13915# Junta de Energia Nuclear, Madrid (Spain). Div. de Metrologia de Radiaciones.
RECOMMENDED VALUES OF THE HUMIDITY CORRECTION FACTOR k SUB h FOR DETERMINING EXPOSURE IN AN X-RAY BEAM WITH FREE-AIR CHAMBERS
J. M. LosArcos and A. Brosed 1983 196 p refs In SPANISH; ENGLISH summary
(JEN-542; ISSN-0081-3397) Avail: NTIS HC A09/MF A01

The experimental values stated by CCEMRI concerning the humidity correction factor k(h) required for determining exposure in an X-ray beam with free-air chambers are considered and a method to estimate k(h) numerically, at any particular combination of relative humidity, pressure and temperature, is explained. A table of r(h), calculated for relative humidity varying from 0 percent to 90 percent, for pressures in the range of 70 kPa to 104 kPa and temperatures between 15 C and 30 C, is included. Author

N84-13916# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE, BIMONTHLY BULLETIN, NO. 1982-3, 208/MAY-JUNE 1982
Claude Sevestre, ed. Paris ESA Oct. 1982 82 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris)

No. 1982-3, 208/May-Jun. 1982 p 145-223 Individual titles previously announced as A83-12343 through A83-12348 Sponsored by ESA
(ESA-TT-771) Avail: NTIS HC A05/MF A01; Original ENGLISH version available from ONERA, Paris FF 55; original report in FRENCH available from ONERA, Paris

Topics addressed include the following: noise generation by propellers or rotors; variable frequency transducers; stability of crystal oscillators; static-split telescope; thin film pressure transducers; optical sensor for measurement of position; architecture for scientific software; hot wire gauges for skin friction measurement; and fan noise sources. B.G.

N84-13917 Pennsylvania State Univ., University Park.
INTRODUCTION: ADVANCES AND OPPORTUNITIES IN CLUSTER RESEARCH
A. W. Castleman, Jr. 1983 13 p refs Presented at 13th Intern. Conf. on the Phys. of Electron. and Atomic Collisions (ICPEAC), Berlin, 27 Jul. 1983
(Contract DE-AC02-82ER-60055)
(DE84-000364; CONF-830706-7) Avail: NTIS MF A01

Examples of neutral and ionic clusters include these in the upper and lower atmosphere, interstellar grain formation, combustion, radiation physics and chemistry, surface bombardment, fission product transport in reactors, corrosion, etc. A brief overview of some recent developments in cluster research is presented. DOE

N84-13918# California Univ., Livermore. Lawrence Livermore Lab.
ANALYTICAL STUDIES OF ADVANCED HIGH-FIELD DESIGNS: 20-TESLA LARGE-BORE SUPERCONDUCTING MAGNETS
R. W. Hoard, D. N. Cornish, R. M. Scanlan, J. P. Zbasnik, R. L. Leber, R. B. Hickman, and J. D. Lee 30 Sep. 1983 8 p refs Presented at the 8th Intern. Conf. on Magnet Technol., Grenoble, France, 5-9 Sep. 1983
(Contract W-7405-eng-48)
(DE83-017591; UCRL-89699; CONF-830971-3) Avail: NTIS HC A02/MF A01

Several emerging technologies were combined in a conceptual design study demonstrating the feasibility of producing ultrahigh magnetic fields from large-bore superconducting solenoid magnets. Several designs were produced that approach peak fields of 20-T in 2.0-m diameter inner bores. The analytical expressions comprising the main features of CONDUCTOR and ADVMAGNET, the two computer programs used in the design of these advanced magnets, are also discussed. These magnets and design techniques will make a paramount contribution to the national mirror-fusion endeavor and to the newly emerging field of nuclear magnetic resonance (NMR) whole-body scanners. DOE

N84-13919# Stanford Linear Accelerator Center, Calif.
TOWARD A CONSTRUCTIVE PHYSICS
H. Pierre Noyes, Christoffer Gefwert (Academy of Finland, Helsinki), and Michael J. Manthey (New Mexico Univ., Albuquerque) Jun. 1983 91 p Presented at the 7th Congr. of Logic, Methodology and Philosophy of Sci., Salzburg, Austria, 11-16 Jul. 1983
(Contract DE-AC03-76SF-00515)
(DE83-016644; SU-SLAC-PUB-3116; CONF-830789-1) Avail: NTIS HC A05/MF A01

The discretization of physics which has occurred thanks to the advent of quantum mechanics has replaced the continuum standards of time, length and mass which brought physics to maturity by counting. The (arbitrary in the sense of conventional dimensional analysis) standards were replaced by three dimensional constants: the limiting velocity c, the unit of action h, and either a reference mass (eg m/sub p/) or a coupling constant (et G related to mass scale by hc/(2(LC OMEGA)Gm/sub/p(2)) approx. - 1.7 x 10 to the 38th power. Once these physical and experimental reference standards are accepted, the conventional approach is to connect physics to mathematics by means of dimensionless ratios. A program for physics which will meet these rigid criteria while preserving, in so far as possible, the successes that conventional physics has already achieved is outlined. DOE

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution.*

N84-13920 California Univ., Los Angeles.
NONLINEAR ACOUSTICS IN A DISPERSIVE CONTINUUM: RANDOM WAVES, RADIATION PRESSURE, AND QUANTUM NOISE Ph.D. Thesis
Michael Anthony Cabot 1983 90 p
Avail: Univ. Microfilms Order No. DA8314646

The nonlinear interaction of sound with sound is studied using dispersive hydrodynamics which derived from a variational principle and the assumption that the internal energy density depends on gradients of the mass density. The attenuation of sound due to nonlinear interaction with a background is calculated and is shown to be sensitive to both the nature of the dispersion and decay bandwidths. The theoretical results are compared to those of low temperature helium experiments. A kinetic equation which described the nonlinear self-inter action of a background is derived. When a Deybe-type cutoff is imposed, a white noise distribution is shown to be a stationary distribution of the kinetic equation. The attenuation and spectrum of decay of a sound wave due to nonlinear interaction with zero point motion is calculated. In one dimension, the dispersive hydrodynamic equations are used to calculate the Langevin and Rayleigh radiation pressures of wave packets and solitary waves. Dissert. Abstr.

N84-13921 Illinois Univ., Chicago.
ACOUSTIC MODELLING AND ANALYSIS OF PULSATING COMBUSTION IN A GAS-FIRED PULSE BURNER Ph.D. Thesis
Sang Heun Oh 1983 144 p
Avail: Univ. Microfilms Order No. DA8312256

The pulse combustion process is self-excited by the acoustic combustion inter-coupling as evidence by the larger timewise variation of firing rates. The present acoustic model provides an analytical means to assess the overall performance of the pulse combustion process and to determine combustion parameters and the acoustic structure of the flame. The spectral behavior of flame pulsation, sound pressure level and overall flow field are presented for selected firing conditions for the plane mode oscillation. Dissert. Abstr.

N84-13922*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ON SOME FLOW CHARACTERISTICS OF CONVENTIONAL AND EXCITED JETS
Uwe H. vonGlahn [1983] 22 p refs Proposed for presentation at the 22nd Aerospace Sci. Meeting, Reno, Nev., 9-12 Jan. 1984; sponsored by AIAA
(NASA-TM-83503; E-1843; NAS 1.15:83503) Avail: NTIS HC A02/MF A01 CSCL 20A

Improved correlations of jet centerline velocity and static temperature decay data for convergent nozzles are developed. From these empirical correlations, a relationship was devised by which the static temperature decay for a nonisothermal jet plume can be determined from cold-flow jet centerline velocity decay data or prediction. This relationship is shown to apply as well to jet plumes for various nozzle shapes. It is assumed, by analogy, that this relationship also applies to acoustically excited jet plumes. Jet plume spreading with and without excitation is discussed. Finally, the radial velocity and temperature profiles for conventional and enhanced mixing jet flows are shown and their implication for excited flows is discussed. Author

N84-13923*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE COMPRESSIBLE AERODYNAMICS OF ROTATING BLADES BASED ON AN ACOUSTIC FORMULATION
Lyle N. Long Dec. 1983 70 p refs
(NASA-TP-2197; L-15652; NAS 1.60:2197) Avail: NTIS HC A04/MF A01 CSCL 20A

An acoustic formula derived for the calculation of the noise of

moving bodies is applied to aerodynamic problems. The acoustic formulation is a time domain result suitable for slender wings and bodies moving at subsonic speeds. A singular integral equation is derived in terms of the surface pressure which must then be solved numerically for aerodynamic purposes. However, as the 'observer' is moved onto the body surface, the divergent integrals in the acoustic formulation are semiconvergent. The procedure for regularization (or taking principal values of divergent integrals) is explained, and some numerical examples for ellipsoids, wings, and lifting rotors are presented. The numerical results show good agreement with available measured surface pressure data. Author

N84-13924*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
INVERTED VELOCITY PROFILE SEMI-ANNULAR NOZZLE JET EXHAUST NOISE EXPERIMENTS
Jack H. Goodykoontz Dec. 1983 23 p refs
(NASA-TM-83525; E-1890; NAS 1.15:83525) Avail: NTIS HC A02/MF A01 CSCL 20A

Experimental noise data are shown for a conical nozzle with a semi-annular secondary flow passage having secondary to primary velocity ratios ranging from 1.0 to 1.4. Spectral data are presented at different directivity angles in the flyover plane with the semi-annular flow passage located either on the same side or opposite side relative to an observer. A 10.0 cm diameter primary conical nozzle was used with a 2.59 cm and 5.07 cm wide annular gap secondary nozzle. Similar trends were observed for both nozzle configurations. In general, near the peak noise location and at velocity ratios greater than 1.0, noise levels were larger on the side where the secondary passage was closest to an observer. At velocity ratios near 1.0 the opposite was true. When compared to predicted noise levels for a conical nozzle alone operating at the same ideal thrust, the semi-annular configuration showed no benefit in terms of noise attenuation. Author

N84-13925# Naval Postgraduate School, Monterey, Calif. Group for Environmental Acoustic Research.
AN INTRODUCTION TO THE PARABOLIC EQUATION FOR ACOUSTIC PROPAGATION
Alan B. Coppens Nov. 1982 45 p
(Contract N00014-83-WR-30104; RR00001)
(AD-A132315; NPS61-83-002) Avail: NTIS HC A03/MF A01 CSCL 20/1

The derivation of the parabolic wave equation for acoustic propagation is studied and presented pedagogically for tutorial purposes. The literature is reviewed and modifications to the parabolic equation to increase accuracy are mentioned. Some of the algorithms for computer implementations of the parabolic approximation are discussed qualitatively, and the various approaches to dealing properly with the density change between the water column and the bottom are examined. Author (GRA)

N84-13926# Army Materials and Mechanics Research Center, Watertown, Mass.
COMPUTER-BASED ULTRASONIC MULTIPLE-FREQUENCY PULSE-ECHO TEST SYSTEM Final Report
Otto R. Gericke Jul. 1983 45 p
(AD-A132227; AD-E401062; AMMRC-TR-83-43) Avail: NTIS HC A03/MF A01 CSCL 14/2

A computer-based ultrasonic pulse-echo test system that encompasses three separate ranges of test frequencies is described in this report. Three super-imposed pulse-echo traces are produced, which are displayed in different colors. The system therefore yields amplitude vs time as well as amplitude vs frequency information. Illustrative applications of the test system are discussed, which include determining transducer frequency response, transducer coupling conditions, ultrasonic beam diffraction, defect test sensitivity, microstructure of materials, and dispersion. Author (GRA)

N84-13927# Naval Research Lab., Washington, D. C.
OPTIMUM DEPTH OF PROPAGATION IN SHALLOW WATER Interim Report
David A. Gershfeld and Frank Ingenito 23 Aug. 1983 17 p
(AD-A132182; AD-E850405; NRL-8741) Avail: NTIS HC A02/MF A01 CSCL 20/1

A numerical simulation study was conducted to determine the receiver depth which would maximize the signal-to-wind noise ratio for one of several source depths in various shallow water environments. The environments were chosen to cover the full range typically found in shallow water: four sediment types ranging from fine sand to silty clay, three sound-speed profiles in the water column (isovelocity, positive gradient, and negative gradient), source depths within and below the gradient in the water sound-speed profile, and source frequencies in octaves from 50 to 800 Hz. For each case, a transmission-loss model and a wind-noise model were run. The results were then combined to yield a signal-to-noise level. By using a contouring technique, the data were reduced sufficiently to interpret the effects of the source depth, bottom type, velocity structure in the water column, and source frequency on the location of the optimum receiver depth. For frequencies above 200 Hz, the optimum depth was nearly independent of frequency and sediment type. In most cases, the optimum depth was equal to the source depth. In 75% of the cases the optimum depth was middepth or below. The location of the best signal-to-noise ratio (S/N) was in most cases independent of the wind-noise field. GRA

N84-13928# Ames Lab., Iowa.
ULTRASONIC 3-D RECONSTRUCTION OF INCLUSIONS IN SOLIDS USING THE INVERSE BORN ALGORITHM
D. K. Hsu, James H. Rose, and D. O. Thompson 1983 24 p refs Presented at the Conf. on the Rev. of Progr. in Quantitative NDE, Santa Cruz, Calif., 7-12 Aug. 1983
(Contract W-7405-eng-82)
(DE83-018082; IS-M-444; CONF-830811-8) Avail: NTIS HC A02/MF A01

An extensive study of the determination of geometric parameters (size, shape, and orientation) of included flaws using the one-dimensional inverse Born approximation. Investigation of the degradation of the 1-D Born inversion algorithm due to resonances and scattering showed that the degradation was not serious provided adequate frequency bandwidth was available. For inclusions in realistic structural materials, high degrees of geometric symmetry in flaw shape and vast mismatch of impedance between the flow and host material are not expected, strong and sharp characteristic resonances are therefore considered less likely. In the course of developing a reconstruction scheme in the terms of an equivalent ellipsoid, the general case of an arbitrarily oriented ellipsoidal flaw was considered and the tangent plane distance, the tangent point distance and the transformation between them analyzed. The method developed was performed quite well in determining the size, shape, and orientation of ellipsoid-like flaws. The reconstruction technique was demonstrated for an inclusion in the bulk, for a void in metal and for an inclusion near a fluid-solid interface. DOE

N84-13929# Argonne National Lab., Ill. Materials Science and Technology Div.
DEVELOPMENT OF ULTRASONIC METHODS FOR THE NON-DESTRUCTIVE INSPECTION OF CONCRETE
T. M. Claytor and W. A. Ellingson Aug. 1983 9 p refs Presented at the Intern. Ultrasonics Conf., Halifax, Nova Scotia, 12-14 Jul. 1983
(Contract W-31-109-eng-38)
(DE83-017923; CONF-8307991) Avail: NTIS HC A02/MF A01

Nondestructive inspection of Portland cement and refractory concrete is conducted to determine strength, thickness, presence of voids or foreign matter, presence of cracks, amount of degradation due to chemical attack, and other properties without the necessity of coring the structure (which is usually accomplished by destructively removing a sample). The state of the art of acoustic nondestructive testing methods for Portland cement and refractory concrete is reviewed. Most nondestructive work on concrete has concentrated on measuring acoustic velocity by through transmission methods. Development of a reliable pitch-

catch or pulse-echo system would provide a method of measuring thickness with access from only one side of the concrete.
DOE

N84-13930# Ames Lab., Iowa.
EFFECTS OF A FINITE APERTURE ON THE INVERSE BORN APPROXIMATION
V. G. Kogan and J. H. Rose 1983 18 p refs Presented at the Conf. on Quantitative NDE, Santa Cruz, Calif., 7-12 Aug. 1983
(Contract W-7405-eng-82)
(DE83-018086; IS-M-441; CONF-830811-13) Avail: NTIS HC A02/MF A01

One of the most important effects of complex part geometry is that the available entrance and exit angles for ultrasound are limited. The Inverse Born approximation in which data for incident (and exit) directions confined to a conical aperture was studied. Modeling the direct problem by the Born Approximation, analytical results for (1) a weak spherical inclusion, and (2) a penny shaped crack (modeled by an oblate spheroid) were obtained. General results are: (a) the value of the characteristic function (BETA) is constant in the interior of the flaw, but reduced in value; (b) the discontinuity at the boundary of the flaw occurs over the lighted portion of the flaw; (c) this discontinuity is contrasted by a region where (BETA) is negative; and (d) new non-physical discontinuities and non-analyticities appear in the reconstructed characteristic function. These general features also appear in numerical calculations which use as input strong scattering data from a spherical void and a flat penny shaped crack in Titanium. DOE

N84-13931# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
A SURVEY OF UNDERWATER-ACOUSTIC RAY TRACING TECHNIQUES
R. M. Jones Jun. 1983 75 p refs
(PB83-250522; NOAA-TM-ERL-WPL-111; NOAA-83081103) Avail: NTIS HC A04/MF A01 CSCL 20A

A survey of techniques and features available in underwater acoustic ray tracing computer programs is presented. The survey includes methods for constructing raypath trajectories, construction eigenrays, ray-intensity calculations, and ray theory corrections. The survey also includes models for sound speed (including interpolation methods), ocean bottom (including both bathymetry and reflection coefficient), ocean surface reflection coefficient, dissipation, temperature, salinity, and ocean current. In addition, methods for displaying models and methods for presenting ray tracing results are surveyed. GRA

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N84-13932 California Univ., Irvine.
THE MHD STABILITY OF INERTIA-TIED Z-PINCHES WITH APPLICATION TO SOLAR CORONAL LOOPS Ph.D. Thesis
Sam Siu-Lam Ma 1982 162 p
Avail: Univ. Microfilms Order No. DA8313800

Solar coronal loops are observed to be amazingly stable structures. To be able to understand why, we need to know something about their magnetic fields, their pressure profiles and their special boundary conditions at the surface of the Sun. Theoretical models are constructed to fit the observational data collected from various sources and then the stability of the loops is analyzed by using the laws of plasma physics. First a reasonable equilibrium field/pressure model is chosen, which can provide some stability effect. However, the photospheric inertia-typing boundary conditions, due to the anchoring of the feet of the loops at the surface of the Sun, are the major stability factor. The energy principle is used extensively on the above magnetohydrodynamic system. The results of such applications enable us to determine the critical parameter (the aspect ratio of the loop, for example) which specifies stability. Dissert. Abstr.

N84-13933*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE MARSHALL SPACE FLIGHT CENTER LOW-ENERGY ION FACILITY: A PRELIMINARY REPORT
A. P. Biddle, J. W. Reynolds, W. L. Chisholm, Jr., and R. D. Hunt Oct. 1983 25 p refs
(NASA-TM-82559; NAS 1.15:82559) Avail: NTIS HC A02/MF A01 CSCL 20H

The Low-Energy Ion Facility (LEIF) is designed for laboratory research of low-energy ion beams similar to those present in the magnetosphere. In addition, it provides the ability to develop and calibrate low-energy, less than 50 eV, plasma instrumentation over its full range of energy, mass, flux, and arrival angle. The current status of this evolving resource is described. It also provides necessary information to allow users to utilize it most efficiently.
Author

N84-13934# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
A STUDY OF THICK-TARGET X-RAY SPECTRA USING PHOTONUCLEAR REACTIONS Ph.D. Thesis
Karl L. Prado 1983 234 p
(AD-A132543; AFIT/CI/NR-83-37D) Avail: NTIS HC A11/MF A01 CSCL 20/8

Megavoltage bremsstrahlung spectra which are produced in thick targets were investigated using photonuclear reactions. Ratios of photonuclear yields in teflon and in K2SiF6 were obtained that serve as sensitive indexes of thick target X-ray quality and endpoint energy in the energy range from about 14 to 30 MeV. Because thick target bremsstrahlung spectra have never before been used in the determination of photonuclear reaction cross sections, a numerical analysis computer calculation of thick target bremsstrahlung spectra was written to approximate the spectra of X-rays produced in thick targets of clinical electron linear accelerators and examine the feasibility of using such spectra for cross section determinations. The spectra obtained by computer simulation were used to calculate the photonuclear cross section of the 27 A1(gamma, 2p)Superscript 25Na reaction from 25 to 33 MeV. The calculated cross section is reported and is compared to a previously reported cross section and to a cross section calculated using thin target bremsstrahlung spectra. Analyses of the results obtained indicate that thick target X-ray spectra can be used for photonuclear reaction cross section determination.
GRA

N84-13935# Naval Surface Weapons Center, White Oak, Md.
SHOCK INDUCED MOLECULAR EXCITATION IN SOLIDS Interim Report
Frank J. Zerilli 6 Apr. 1983 63 p
(AF Proj. 2301)
(AD-A132236; AD-F500197; NSWC/TR-83-90) Avail: NTIS HC A04/MF A01 CSCL 20/8

Initiation of condensed explosives is studied on a molecular level with a quantum mechanical calculation of transition rates for shock induced transitions between low lying internal molecular normal mode states in a molecular solid. It is assumed that the shock produces a distribution of acoustic phonons which becomes thermalized before any significant internal mode phonons are created. The calculation uses the Born-Oppenheimer approximation in which the internal modes constitute the fast subsystem and the acoustic modes constitute the slow system. A sample calculation is done for nitromethane. Generally speaking, the lowest frequency internal modes have the fastest shock induced transition rates, with the transition from the ground to first excited state being the slowest. The transition rates increase by six to ten orders of magnitude from the values under normal conditions when nitromethane is subjected to shocks of 50 to 300 kbar. The transition lifetimes are compared with, and show some correlation with, the pressure time critical shock initiation data obtained by de Longueville, Fauquignon, and Moulard. GRA

N84-13936# Los Alamos Scientific Lab., N. Mex.
PR BEAM-PULSE FORMATION AND CONTROL
R. A. Hardekopf 1983 7 p refs Presented at the 7th Meeting

of the Intern. Collaboration on Adv. Neutron Sources, Ontario, 12-15 Sep. 1983
(Contract W-7405-eng-36)
(DE84-001354; LA-UR-83-2593; CONF-8309156-2) Avail: NTIS HC A02/MF A01

The Proton Storage Ring (PSR) is a major addition to the Weapons Neutron Research Facility (WNR) at LAMPF. It will act as a bunch compressor for the relatively long linac macropulses from LAMPF, tailoring them into short, intense pulses ideally suited for neutron scattering research. This paper concentrates on the methods used to form these pulses before injection into the linac, to multiplex the PSR beam with other LAMPF users, and to the WNR mechanical neutron chopper at extraction. DOE

N84-13937# Clarkson Coll. of Technology, Potsdam, N.Y. Dept. of Physics.
RAMAN AND FLUORESCENT SCATTERING BY MOLECULES EMBEDDED IN SMALL PARTICLES
Herman W. Chew and Peter J. McNulty 15 Oct. 1983 22 p refs
(Contract DE-AC02-77EV-04361)
(DE84-001278; DOE/EV-04361/T4) Avail: NTIS HC A02/MF A01

A model for fluorescent and Raman scattering by molecules embedded in or in the vicinity of small particles was formulated. The model takes into account the size, shape, refractive index, and morphology of the host particles. Analytic and numerical results were obtained for spherical (one and more layers, including magnetic dipole transitions) cylindrical and spheroidal particles. Particular attention was given to the spherical case with fluorescent/Raman scatterers uniformly distributed in the particles radiating both coherently and incoherently. Depolarization effects were studied with suitable averaging process, and good agreement with experiment was obtained. Analytic and numerical results were obtained for the elastic scattering of evanescent waves; these results are useful for the study of fluorescent under excitation by evanescent waves. DOE

N84-13938# Argonne National Lab., Ill. Physics Div.
THE 3-BODY FORCES, RELATIVISTIC EFFECTS, ISOBARS, AND PIONS IN NUCLEAR SYSTEMS
R. B. Wiringa 1983 8 p refs Presented at the 3rd Intern. Conf. on Recent Progress in Many-Body Theories, Altenberg, West Germany, 29 Aug. 1983
(Contract W-31-109-eng-38)
(DE84-000163; CONF-8308125-2) Avail: NTIS HC A02/MF A01

Conventional microscopic calculations in nuclear physics start from a nonrelativistic Hamiltonian. The many body Schroedinger equation is then solved to obtain the ground state energy, wave function, and expectation values of other quantities of interest. Such a procedure gives a qualitative description of nuclear saturation properties, but it is now well established that the simple H is quantitatively inadequate. For example, the light nuclei are underbound with too large a charge radius, while nuclear matter is overbound at far too high a density. Recent studies that go beyond the simple H are reviewed. These include: (1) the introduction of three nucleon potentials, (2) estimates of relativistic effects, (3) the introduction of isobar degrees of freedom in the two body potential, and (4) probing the influence of pion degrees of freedom on nuclear systems. DOE

N84-13939# Sandia Labs., Albuquerque, N. Mex.
DIRECT MEASUREMENT OF THE ENERGY SPECTRUM OF AN INTENSE PROTON BEAM
R. J. Leeper, J. R. Lee, L. Kissel, D. J. Johnson, W. A. Stygar, D. E. Hebron, and L. D. Roose 1983 5 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12 Sep. 1983
(Contract DE-AC04-76DP-00789)
(DE84-000457; SAND-83-0608C; CONF-830911-19) Avail: NTIS HC A02/MF A01

A time-resolved magnetic spectrometer was used to measure the energy spectrum of an intense (0.5 TW/cm(2)) proton beam. A thin (2400 A) gold foil placed at the focus of an ion diode Rutherford scattered protons by 900 into the spectrometer, reducing the beam intensity to a level suitable for magnetic analysis. The scattered beam was collimated by two 1 mm diameter apertures separated by 12.3 cm. The collimated protons were deflected in a 12.7 cm diameter, 6.65 Kg samarium-cobalt permanent magnet. The deflected protons were recorded simultaneously or CR-39 and eight 1 mm(2) by 35 (SIGMA)m thick PIN diodes. A Monte Carlo computer code was used to calculate the sensitivity and resolution of the spectrometer. Data taken on Proto-I show a 150 keV to 250 keV wide proton energy spectrum at each instant in time. DOE

N84-13940# Sandia Labs., Albuquerque, N. Mex.
THOMSON-SCATTERING MEASUREMENTS OF ELECTRON TEMPERATURE AND DENSITY IN A PLASMA CHANNEL CREATED BY A RELATIVISTIC ELECTRON BEAM
G. R. Allen, H. Parke Davis, and John E. Brandenburg 1983 5 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12 Sep. 1983
(Contract DE-AC04-76DP-00789)
(DE84-000356; SAND-83-0590C; CONF-830911-20) Avail: NTIS HC A02/MF A01

The electron density (n sub e) and temperature (T sub e) of the plasma channel created by the propagation of a relativistic electron beam in air was measured by a ruby laser Thomson scattering diagnostic. The measurements were made with an electron beam accelerator (1.6 MV, 21 kA, 70 ns) at various times during the plasma channel development, with 25 ns temporal resolution and 2 mm radial resolution. Results are in good agreement with the theoretical results of the Air Propagation Code: n sub e = 1.65 x 10(15) cm(+3), T sub e = 2.59 eV. Signal-to-noise is very good (10:1), limited by X-ray fluorescence of the fiber optics at the spectrometer. In fielding the diagnostic on higher energy accelerators, however, the dominant noise is expected to be the background light from the plasma and hot gas, or the fluorescence of the collecting optics. Improvements to the diagnostic and an ongoing experiment in 80 Torr of air, 4 MV, 50 kA to address these issues is presented. DOE

N84-13941# Argonne National Lab., Ill. Physics Div.
ASPUN, ARGONNE SUPER INTENSE PULSED PALLATION NEUTRON SOURCE
T. K. Khoe and R. L. Kustom 1983 10 p ref Presented at the 7th Meeting of the Intern. Collaboration on Adv. Neutron Sources, Ontario, Canada, 12 Sep. 1983
(Contract W-31-109-eng-38)
(DE84-000311; CONF-8309156-1) Avail: NTIS HC A02/MF A01

Argonne was in the process of developing plans for pulsed spallation neutron source facilities that would extend the flux levels by at least an order or magnitude over fluxes provided by facilities that are either now in operation or in construction. The facility is called ASPUN for Argonne Super Intense Pulsed Spallation Neutron Source. The heart of ASPUN is a Fixed-Field Alternating Gradient (FFAG) proton synchrotron which has great potential as a driver for a spallation neutron source. The FFAG synchrotron was extensively studied in the 1950's and early 1960's at the Midwestern Universities Research Association laboratories in Stoughton, Wisconsin. A FFAG accelerator has dc excited magnetic fields into which a beam is injected on the inside radius and as the beam is accelerated, the average equilibrium orbit radius grows. Frequency modulated RF cavities are used to accelerate the beam with a voltage and frequency program that tracks the beam energy. The conceptual design of the FFAG synchrotron is given. DOE

N84-13942# Los Alamos Scientific Lab., N. Mex.
RECENT DEVELOPMENTS IN THE UNDERSTANDING OF PION-NUCLEUS SCATTERING
Mikkel B. Johnson 1983 55 p refs Presented at the Intern. Symp. on Nucleon-Nucleon Interaction and Nucl. Many-body Probl., Peking, 1 Jul. 1983
(Contract W-7405-eng-36)
(DE84-001017; LA-UR-83-2851; CONF-8307102-1) Avail: NTIS

HC A04/MF A01

The theory of pion nucleus scattering development in a field theoretical framework is presented. The theory is designed to describe pion elastic scattering and single and double charge exchange to isobaric analog states. Data at low and resonance energies were analyzed. Strong modifications to the simple picture of the scattering as a succession of free pion nucleon interactions are required to understand the data. The microscopic theory of the experiment is outlined. DOE

N84-13943# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.

STATISTICAL PROPERTIES OF DEEP INELASTIC REACTIONS

L. G. Moretto Aug. 1983 29 p refs Presented at the Intern. Conf. on Nucl. Phys., Florence, 29 Aug. 1983

(Contract DE-AC03-76SF-00098)

(DE84-000722; LBL-16390; CONF-830833-2) Avail: NTIS HC A03/MF A01

The multifaceted aspects of deep inelastic heavy ion collisions are discussed in terms of the statistical equilibrium limit. It is shown that a conditional statistical equilibrium, where a number of degrees of freedom are thermalized while others are still relaxing, prevails in most of these reactions. The individual degrees of freedom that were explored experimentally are considered in their statistical equilibrium limit, and the extent to which they appear to be thermalized is discussed. The interaction between degrees of freedom on their way towards equilibrium is shown to create complex feedback phenomena that may lead to self regulation. A possible example of self regulation is shown for the process of energy partition between fragments promoted by particle exchange. DOE

N84-13944# Pacific Northwest Lab., Richland, Wash.

DOUBLE BETA DECAY: RECENT DEVELOPMENTS AND PROJECTIONS

F. T. Avignone, III (South Carolina Univ.), R. L. Brodzinski, D. P. Brown, J. C. Evans, Jr., W. K. Hensley, J. H. Reeves, and N. A. Wogman Aug. 1983 23 p refs Presented at the 4th Ann. Weak Interactions Conf., Philadelphia, 1 Jun. 1983

(Contract DE-AC06-76RL-01830; Grant NSF PHY-82-09562)

(DE84-000476; PNL-SA-11555; CONF-8306127-1) Avail: NTIS HC A02/MF A01

Recent events in both theoretical and experimental aspects of double beta decay are reported. General theoretical considerations, recent developments in nuclear structure theory, geochronological determinations of half lives and ratios and laboratory experiments are discussed. DOE

N84-13945# Schafer (W. J.) Associates, Inc., Wakefield, Mass.

ASSESSMENT OF THE ADEQUACY OF US ACCELERATOR TECHNOLOGY FOR DEPARTMENT OF ENERGY MISSIONS

E. T. Gerry and S. A. Mani Sep. 1983 109 p refs

(Contract DE-AC01-82ER-40075)

(DE84-001632; DOE/ER-0176) Avail: NTIS HC A06/MF A01

Accelerator technology has made an enormous impact across a wide field of research, industrial, and commercial endeavor and developments are projected to broaden this technology transfer and open up applications not previously possible or economically attractive. At the same time, however, the broad multi-agency base of support for the development of accelerator technology has largely evaporated. In order to continue to reap the benefits and spin-offs from this area of technology, an expanded long-term funding commitment is vigorously endorsed since there appears to be major payoff potential in several areas of national need. Three specific recommendations are made that would accelerate the projected benefits from accelerator technology. An expanded effort should be undertaken to develop the key technologies of high brightness, high current, large area, long life, reliable ion, electron and RF sources along with associated studies directed toward accelerator design optimization. DOE

N84-13946# Los Alamos Scientific Lab., N. Mex.

SIMULATION STUDIES ON A NOVEL BETATRON INJECTION SCHEME

William Peter, Rickey J. Faehl, and Frederick Mako (NRL) 1983 5 p refs Presented at the 5th Intern. Conf. on High Power Electron and Ion-Beam Res. and Technol., San Francisco, 12-14 Sep. 1983

(Contract W-7405-eng-36)

(DE84-001337; LA-UR-83-2669; CONF-830911-32) Avail: NTIS HC A02/MF A01

The feasibility of external transport into a modified betatron by the propagation of a relativistic electron beam into a zeta pinch channel is discussed. Results from particle in cell simulations do not indicate any deleterious instabilities. Though the plasma collision frequency is shown to be just large enough to suppress the beam-plasma instability, a discharge current tapering scheme for decreasing the beam perpendicular velocity also is a principal stabilizing mechanism. A new high-frequency microwave source is also detailed. DOE

N84-13947# California Univ., Livermore. Lawrence Livermore Lab.

BEAM DYNAMICS IN THE ADVANCED TEST ACCELERATOR (ATA)

G. J. Caporaso, W. A. Barletta, D. L. Birx, R. J. Briggs, Y. P. Chong, A. G. Cole, T. J. Fessenden, R. E. Hester, E. J. Lauer, V. K. Neil et al 28 Sep. 1983 7 p refs Presented at the 5th Inter. Con. on High-Power Particle Beams, San Francisco, 12-14 Sep. 1983 Submitted for publication

(Contract W-7405-eng-48)

(DE84-001421; UCRL-89881; CONF-830911-33) Avail: NTIS HC A02/MF A01

The performance of the Advanced Test Accelerator, a 50 MeV, 10 KA induction linac is reviewed. The operation of the plasma cathode electron source, beam transport throughout the accelerator, and transverse instabilities are covered. Particular emphasis is placed on the beam breakup instability and on the methods used to minimize it. These include a program of design changes that lead to an order of magnitude reduction in the Q's of the accelerator cavity modes and optimization of the transport tune. DOE

N84-13948# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.

SUMMARY OF THE STATUS OF NEGATIVE-ION-BASED NEUTRAL BEAMS

W. S. Cooper Jan. 1983 13 p refs Presented at the 5th Topical Meeting on the Technol. of Fusion Energy, Knoxville, Tenn., 26-28 Apr. 1983

(Contract DE-AC03-76SF-00098)

(DE84-001328; LBL-15616; CONF-830406-12) Avail: NTIS HC A02/MF A01

Negative ion based neutral beam systems which can perform multiple functions for fusion reactors, such as heating, current drive in Tokamak reactors, and establishing and maintaining potential barriers in tandem mirror reactors are discussed. Practical systems operating continuously at the 200 keV, 1 MW level can be built using present day technology. Ion sources were demonstrated which produce D(+) beams with $< 5\%$ electron content, and that operate at linear current densities that are within a factor of 2 of what conservatively designed accelerator/transport structures can handle. Concepts are in hand for transporting the negative ion beam through a neutron maze before neutralization, thus permitting a radiation hardened beamline. With an advanced laser photoneutralizer, overall system power efficiencies of 70% should be possible. DOE

N84-13949# Sandia Labs., Albuquerque, N. Mex.

TOMOGRAPHIC TECHNIQUE IN RELATIVISTIC ELECTRON BEAM EXPERIMENTS

J. Chang and L. D. Kissel 1983 6 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12 Sep. 1983

(Contract DE-AC04-76DP-00789)

(DE84-000357; SAND-83-0607C; CONF-830911-18) Avail: NTIS

HC A02/MF A01

A tomographic technique was developed for diagnosing relativistic electron beams. It offers a nonperturbing and noninvasive method to map the time-dependent 2-D cross section of the beam. DOE

N84-13950# Los Alamos Scientific Lab., N. Mex.
SPACE-TIME EVOLUTION OF THE NONLINEAR 2-STREAM INSTABILITY
Don S. Lemons, Michael E. Jones, and Huan Lee 1983 5 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12-14 Sep. 1983
(Contract W-7405-eng-36)
(DE84-001336; LA-UR-83-2670; CONF-830911-30) Avail: NTIS HC A02/MF A01

A cold electron beam penetrating a cold plasma is electrostatically unstable. The instability produces a growing electric field that saturates when the beam electrons are suddenly trapped by a single wave. During trapping a significant amount of energy is transferred from the beam to the field and ultimately to the plasma. Experiments are being performed that demonstrate this anomalous beam-driven plasma heating. The heating efficiency is a function of the phase velocity of the trapping wave. According to a generalization of a previous calculation, the instability is absolute and its wave form evolves in both space and time. Modifying trapping theory to account for the space and time evolution of the two-stream instability, it is found that the heating efficiency should change in time. This prediction is in agreement with results from one-dimensional PIC simulations. DOE

N84-13951# Sandia Labs., Albuquerque, N. Mex.
PROTO-I AXIAL-FOCUSING EXPERIMENTS
D. J. Johnson, R. J. Leeper, W. A. Stygar, and S. A. Slutz 1983 5 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12 Sep. 1983
(Contract DE-AC04-76DP-00789)
(DE84-000458; SAND-83-0610C; CONF-830911-21) Avail: NTIS HC A02/MF A01

The time-integrated axial (z) focus of the 4.5-cm-radium Proto I (1.5 MV, 500 KA radial proton diode is presently limited to approx. 3 mm full width at half maximum (FWHM). This result is obtained with current neutralized beam transport in a gas cell with 6 Torr argon. If the vertical local divergence were the same (10 or less) as the horizontal divergence, the local divergence alone would produce a 1.5 mm FWHM focus. The axial focal size is evidently limited by time-dependent effects. These are studied by observing the beam incident upon various targets with two time-resolved pinhole cameras. The first camera observes Rutherford-scattered protons from gold targets with an array of 11 silicon PIN detectors. The second camera observes K sub (-) fluorescence from aluminum targets with 4 independently-gated microchannel plates imaging tubes. DOE

N84-13952# Los Alamos Scientific Lab., N. Mex.
ARCHSIM: A PROTON-SYNCHROTRON TRACKING PROGRAM, INCLUDING LONGITUDINAL SPACE CHARGE
Henry A. Thiessen and J. L. Warren 1983 7 p refs Presented at the EPS Conf. on Computing in Accelerator Design and Operation, Berlin, 20-23 Sep. 1983
(Contract W-7405-eng-36)
(DE84-001335; LA-UR-83-2703; CONF-8309144-4) Avail: NTIS HC A02/MF A01

A particle-tracking program was written for simulating the acceleration cycle of a rapid-cycling proton synchrotron. A lattice can consist of up to 100 cells and RF cavities. Transport of the beam in six dimensions includes all second-order optical terms. The RF field and proton velocity are treated exactly. Longitudinal space charge is handled in a self-consistent manner. The fluctuations due to the finite number of particles are handled by a Gaussian smoothing algorithm. The program runs on a VAX 11/780 and can track 100 particles without space charge through the full acceleration cycle from 0.8 to 32 GeV in 49 minutes. A thousand particles with space charge takes about ten hours of computer time. DOE

N84-13953# Los Alamos Scientific Lab., N. Mex.
PATH: A LUMPED-ELEMENT BEAM-TRANSPORT SIMULATION PROGRAM WITH SPACE CHARGE
John A. Farrell 1983 7 p refs Presented at the EPS Conf. on Computing in Accelerator Design and Operation, Berlin, 20-23 Sep. 1983
(Contract W-7405-eng-36)
(DE84-001330; LA-UR-83-2702; CONF-8309144-5) Avail: NTIS HC A02/MF A01

The PATH is a group of computer programs for simulating charmed particle beam transport systems. It was developed for evaluating the effects of some aberrations without a time consuming integration of trajectories through the system. The beam transport portion of PATH is derived from the well known program, DECAY TURTLE. PATH contains all features available in DECAY TURTLE (including the input format) plus additional features such as a more flexible random ray generator, longitudinal phase space, some additional beamline elements, and space charge routines. One of the programs also provides a simulation of an Alvarez linear accelerator. The programs, originally written for a CDC 7600 computer system, also are available on a VAX-VMS system. All of the programs are interactive with input prompting for ease of use. DOE

N84-13954# Sandia Labs., Albuquerque, N. Mex.
IBEX: ANNULAR BEAM PROPAGATION EXPERIMENT
M. G. Mazarakis, R. B. Miller, S. L. Shope, J. W. Poukey, J. J. Ramirez, C. A. Ekdahl, and R. J. Adler (Mission Research Corp., Albuquerque, N. Mex.) 1983 5 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12 Sep. 1983
(Contract DE-AC04-76DP-00789)
(DE84-000456; SAND-83-1963C; CONF-830911-22) Avail: NTIS HC A02/MF A01

IBEX is a 4 MV, 100 kA, 20 ns cylindrical isolated Blumlein accelerator. In the experiments reported here, the accelerator is fitted with a specially designed foilless diode which is completely immersed in a uniform magnetic field. Several diode geometries were studied as a function of magnetic field strength. The beam propagates a distance of 50 cm (approx. 10 cyclotron wavelengths) in vacuum before either striking a beam stop or being extracted through a thin foil. The extracted beam was successfully transported 60 cm downstream into a drift pipe filled either with 80 or 640 torr air. The proper parameters for the most quiescent 4 MV, 20 to 40 kA annular beam, were established, and the results compared with available theory and numerical code simulations. DOE

N84-13955# Stanford Linear Accelerator Center, Calif.
MOTION OF IONIZED ELECTRONS UNDER THE INTENSE ELECTROMAGNETIC FIELD OF THE BEAM
Yukihide Kamiya Sep. 1983 9 p
(Contract DE-AC03-75SF-00515)
(DE84-001396; SLAC/AP-6) Avail: NTIS HC A02/MF A01

The motion of an electron ionized from residual gas by the beam becomes relativistic in the case of a high-density beam as in SLC, while the ions produced by the beam remain nonrelativistic. The ionized relativistic electron will be dragged by the beam, and will go away from the beam (electron beam) before the beam passes, even for the very short bunch of SLC. The motions of electrons ionized by the electron beam or by the positron beam are discussed. The density of the beam is uniform and the shape cylindrical (transversely round and longitudinally rectangular). DOE

N84-13956# Los Alamos Scientific Lab., N. Mex.
FILAMENTATION INSTABILITY OF ION ACOUSTIC WAVES DRIVEN BY A SCATTERED RELATIVISTIC BEAM
Huan Lee and Michael E. Jones 1983 5 p refs Presented at the 5th Intern. Topical Conf. on High-Power Electron and Ion-Beam Res. and Technol., San Francisco, 12-14 Sep. 1983
(Contract W-7405-eng-36)
(DE84-001323; LA-UR-83-2671; CONF-830911-29) Avail: NTIS HC A02/MF A01

Ion-acoustic instability driven by a scattered relativistic beam

propagating in a plasma of hot electrons and cold ions is investigated. A fully electromagnetic dispersion relation and its cold beam limit are derived and the general features of the growth rate spectrum are discussed. It is found that this instability is sensitively damaged by the beam temperature. Particle trapping and nonlinear growth are studied by using particle-in-cell simulations. DOE

N84-13957# California Univ., Livermore. Lawrence Livermore Lab.
CALCULATION OF ION CHARGE-STATE DISTRIBUTION IN ECR ION SOURCES
H. I. West, Jr. 8 Dec. 1982 65 p refs
(Contract W-7405-eng-48)
(DE84-000517; UCRL-53391) Avail: NTIS HC A04/MF A01

Starting with the pioneering efforts of Y. Yongen (Louvain-La-Neuve, Belgium) a code was developed to calculate the equilibrium ion charge-state distribution for electron-cyclotron resonance source (ECR) ion sources. Production of ions is caused by the impact ionization of the charge gas from ECR-heated electrons of a few keV. Loss of an ion of a given charge state is from charge exchange and radiative recombination. Ultimately, the ion flows out of the minimum-B containment region. The ion confinement times are calculated using an ion-trap-potential model which is based upon modeling calculations done at Lawrence Livermore National Laboratory (LLNL) for the Tandem Mirror Machine. Using this model requires the Self-consistent determination of the trap potential and thermal electron density in the plasma. Code inputs are as natural density, hot-electron temperature and density, ion temperature, cold-electron temperature, mirror ratio, physical dimensions, and atomic-physics data. Other than that there are no adjustable parameters. Results of comparison of calculations with the limited available data are reasonable. DOE

N84-13958# California Univ., Livermore. Lawrence Livermore Lab.
INTERACTION OF A STREAM OF DIELECTRIC SPHERES IN AN ELECTRIC FIELD IN A HIGH VACUUM
Charles D. Hendricks and Kyekyoon Kim (Illinois Univ., Urbana) 14 Jun. 1983 9 p refs Presented at the Industry Applications Soc. Ann. Meeting, Mexico City, 3-7 Oct. 1983
(Contract W-7405-eng-48)
(DE83-013695; UCRL-89356; CONF-831070-2) Avail: NTIS HC A02/MF A01

The interaction of a stream of dielectric spheres in an electric field in a high vacuum is investigated both theoretically and experimentally. This investigation is motivated by an elaborate attempt to detect fractional electric charges which might exist in matter, namely, a search for isolate quarks in matter. The theoretical analysis is intended for pinpointing the basic interaction mechanism by which a stream of dielectric spheres becomes destabilized in an electric field. One important result of this analysis is a suggested method by which to eliminate the destabilizing forces. The experiments performed are intended to study the behavior of a stream of monodisperse dielectric liquid drops in an electric field in a high vacuum. The deflections of any two drops in the stream with charges differing by one electronic charge is not always the same due to the destabilization effects. DOE

N84-13959# Argonne National Lab., Ill.
MESON-EXCHANGE HAMILTONIAN FOR NN SCATTERING AND ISOBAR-NUCLEUS DYNAMICS
T.-S. H. Lee 1983 22 p refs Presented at the Delta-Nucleus Dyn. Symp., Argonne, Ill., 2 May 1983
(Contract W-31-19-eng-38)
(DE83-017974; CONF-830588-4) Avail: NTIS HC A02/MF A01

A meson-exchange Hamiltonian was constructed for pi, N, delta and N* for NN scattering up to 2 GeV. The model gives good descriptions of the Arndt phase-shifts up to 1 GeV in both the T = 0 and T = 1 channels. The calculated total cross sections sigma/sup tot/, delta sigma/sub L//sup tot/ and sigma/sub T//sup tot/ agree to a large extent with the data in both the magnitudes and the signs. The present calculation gives a sound starting point for future refinements. Among them, a large-scale three-body calculation could be needed to investigate the energy dependence of the effect due to NN interactions in the pi NN channel. Until this effect is carefully studied, it is premature to extract information on dibaryon resonances, if they exist, from the data. The model also gives definite predictions of np scattering. Precise np polarization measurements at higher energy > 0.6 GeV are needed to have a complete test of the model. The present model Hamiltonian can be used to carry our many-body calculations. DOE

N84-13960# Sandia Labs., Albuquerque, N. Mex.
ORIGIN OF ELECTRON-BOMBARDMENT ENHANCED REACTIVITY OF GRAPHITE WITH HYDROGEN
C. I. H. Ashby 1983 4 p refs Presented at the Am. Vacuum Soc. Meeting, Boston, 1 Nov. 1983
(Contract DE-AC04-76DP-00789)
(DE83-017561; SAND-83-1303C; CONF-831171-2) Avail: NTIS HC A02/MF A01

Electronic excitation of graphite by photon or electron bombardment leads to formation of an excited state species which is responsible for the enhancement of the methane formation reaction. The means of inducing the initial excitation is not important; the ultimate consequence will be enhanced erosion. DOE

N84-13961# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.
NEW CONCEPTS IN PARTICLE ACCELERATION
A. M. Sessler Aug. 1983 12 p refs Presented at the 12th Intern. Conf. on High Energy Accelerators, Batavia, Ill., 11-16 Aug. 1983
(Contract DE-AC03-76SF-00098)
(DE83-017747; LBL-16483; CONF-830822-23) Avail: NTIS HC A02/MF A01

Accelerator concepts discussed include the wake-field accelerator, the two-beam accelerator, the inverse free electron laser, and the laser plasma wave accelerator. DOE

N84-13962# Argonne National Lab., Ill.
RELATIVISTIC-BEAM PICKUP TEST FACILITY
S. L. Kramer, J. Simpson, R. Konecny, and D. Suddeth 1983 4 p refs Presented at the 12th Intern. Conf. on High Energy Accelerators, Batavia, Ill., 11 Aug. 1983
(Contract W-31-109-eng-38)
(DE83-017929; ANL-HEP-CP-83-47; CONF-830822-26) Avail: NTIS HC A02/MF A01

With the advent of stochastic beam cooling, the position and frequency response of beam pickups has become a crucial parameter in determining the performance of these systems. The most frequently used method for measuring and calibrating beam pickups is the use of current carrying wires to simulate relativistic beams. This method sometimes leads to incorrect predictions of the pickup response to particle beams. The reasons for the differences are not always obvious but could arise from wires which are incapable of exciting or permitting many of the modes that beams excite or the interaction of the wire with large arrays of pickups produce results which are not easily predicted. These deficiencies are being resolved by calibrating pickups with a relativistic electron beam. This facility is being used extensively by several groups to measure beam pickup devices and is the primary calibration facility for pickups to be used in the FNAL TEV-I Antiproton Source. DOE

N84-13963# Brookhaven National Lab., Upton, N. Y.
ACCELERATION OF HEAVY IONS IN THE AGS AND CBA
Mark Q. Barton 1983 3 p Presented at the 12th Intern. Conf. on High Energy Accelerators, Batavia, Ill., 11-16 Aug. 1983
(Contract DE-AC02-76CH-00016)
(DE83-017762; BNL-33607; CONF-830822-24) Avail: NTIS HC A02/MF A01

A plan was developed to inject ion beams from the Brookhaven Tandem or a cyclotron added to the Tandem into the AGS. This

beam could then be injected into a relativistic heavy ion collider. The availability of many colliding Beam Accelerator (CBA) components adds to the attractiveness of this proposal. DOE

N84-13964# Weizmann Inst. of Science, Rehovoth (Israel).
MULTIQUARK EXOTICS
H. J. Lipkin 1983 11 p refs Presented at the 6th High Energy Heavy Ion Study and the 2nd Workshop on Anomalons, Berkeley, Calif., 28 Jun. 1983 Sponsored in part by the Israel Commission for Basic Research Prepared in cooperation with Argonne National Lab., Ill., and Fermi National Accelerator Lab., Batavia, Ill.
(Contract W-31-109-eng-38)
(DE83-017958; CONF-830675-6) Avail: NTIS HC A02/MF A01

The question 'Are Anomalons Multiquark Exotics' is discussed. It is concluded that so far there is no convincing experimental evidence for any multiquark exotic bound state nor for any exotic resonance. Except for the delta and S* there are no candidates for bound states and no firm theoretical predictions waiting to be tested. Exotic resonances may exist in the 1.5 to 2.0 GeV region and in the charmed sector, e.g., the charmed-strange exotics. The experimental search for multiquark resonances is still open and active. DOE

N84-13965# Stanford Linear Accelerator Center, Calif.
THEORETICAL PERSPECTIVES ON STRANGE PHYSICS
John Ellis Apr. 1983 17 p refs Presented at the Theoret. Symp. on Intense Medium Energy Sources of Strangeness, Santa Cruz, Calif., 19-20 Mar 1983
(DE83-018085; SU-SLAC-PUB-3102; CONF-830339-5) Avail: NTIS HC A02/MF A01

Kaons are heavy enough to have an interesting range of decay modes available to them, and light enough to be produced in sufficient numbers to explore rate modes with satisfying statistics. Kaons and their decays have provided at least two major breakthroughs in fundamental physics: CP violation, and their lack of flavor-changing neutral interactions warned us to expect charm. In addition, K0-anti K0 mixing has provided one of the most elegant and sensitive laboratories for testing quantum mechanics. There is every reason to expect that future generations of kaon experiments with intense sources would add further to fundamental physics. This talk attempts to set future kaon experiments in a general theoretical context, and indicate how they bear upon fundamental theoretical issues. A survey of different experiments which would be done with an Intense Medium Energy Source of Strangeness, including rare K decays, probes of the nature of CP isolation, (SIGMA) decays, hyperon decays and neutrino physics is given. DOE

N84-13966# Purdue Univ., Lafayette, Ind.
PHOTO-INDUCED FIELD EMISSIONS FROM METALLIC SURFACES Final Report
R. Reifenberger Sep. 1983 12 p refs
(Contract DE-AC02-79ER-10464)
(DE84-000872; DOE/ER-10464/4) Avail: NTIS HC A02/MF A01

Photo-induced field emissions is a technique which studies the electrons that photoemitted from small sub-micron metallic surfaces. This experimental method promises to combine the proven utility of both field emission and photoemission for investigating the electronic states near a metal surface. Photon energies in the blue and near UV regions of the electromagnetic spectrum were employed. DOE

N84-13967# California Univ., Livermore. Lawrence Livermore Lab.
SCIENTIFIC PROGRAM AND ABSTRACTS
C. Gerich, ed. 1983 206 p Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12-14 Sep. 1983 Sponsored in part by AFOSR, DARPA, DNA, Maxwell Labs., Inc., ONR, and Physics International Co. Prepared in cooperation with Physics International Co., San Leandro, Calif.
(Contract W-7405-eng-48)
(DE83-017620; CONF-830911) Avail: NTIS HC A10/MF A01

The Fifth International Conference on High-Power Particle Beams is organized jointly by the Lawrence Livermore National Laboratory and Physics International Company. As in the previous conferences in this series, the acceleration and transport; diode physics; high-power particle beam interaction with plasmas and dense targets; particle beam fusion (inertial confinement); collective ion acceleration; particle beam heating of magnetically confined plasmas; and generation of microwave/free-electron lasers are discussed. DOE

N84-13968# Stanford Linear Accelerator Center, Calif.
THE E+E- COLLISIONS IN THE MULTI-TeV REGION
John Ellis May 1983 22 p refs Presented at the 14th Intern. Symp. on Multiparticle Dyn., Lake Takoe, Nev., 22-27 Jun. 1983
(Contract DE-AC03-76SF-00515)
(DE84-000993; SU-SLAC-PUB-3127; CONF-830689-5) Avail: NTIS HC A02/MF A01

A leading role in the elucidation of the Standard Model during the last few years was played by e+e- colliding beam experiments. The e+e- discoveries were made possible by the cleanliness of the experimental conditions and the ability to tune the center of mass energy with precision to the desired value, thus avoiding less interesting background events. Just as past e+e- machines such as SPEAR, DORIS and CESR have uncovered physics inaccessible to hadron-hadron collisions with a center of mass energy several times higher, future e+2- colliders will provide information that could not be duplicated by hadron colliders with much larger center of mass energies. There is a general consensus that the next interesting energy range is likely to be in the TeV range. The capabilities and attributes of an e+e- collider with at least 1 TeV energy per beam. By enabling an important new energy domain to be explored, such an e+e- collider provides physics opportunities which are parallel by hadron-hadron colliding rings with center of mass energies several times higher. DOE

N84-13969# Brookhaven National Lab., Upton, N. Y. Office of the National Synchrotron Light Source.
CONCEPTUAL DESIGN OF A 300-GeV ACCELERATOR BASED ON THE INVERSE FREE-ELECTRON LASER MECHANISM
C. Pellegrini, P. Sprangle (NRL), and W. Zakowicz (Polish Academy of Science) 1983 5 p refs Presented at the 12th Intern. Conf. on High Energy Accelerators, Batavia, Ill., 11-16 Aug. 1983
(Contract DE-AC02-76CH-00016)
(DE84-001471; BNL-33698; CONF-830822-36) Avail: NTIS HC A02/MF A01

An Inverse Free Electron Laser Accelerator and how it can be used to accelerate electrons to energies of several hundred GeV, with an average acceleration rate of 150 MeV/m is discussed. The system scaling laws for several undulators designs and the methods for laser beam transport over the required distance of a few kilometers are discussed. DOE

N84-13970# Argonne National Lab., Ill. Applied Nuclear Physics Sect.
NEUTRON TOTAL CROSS SECTION MEASUREMENTS IN THE ENERGY REGION FROM 47 keV TO 20 MeV
W. P. Poenitz and J. F. Whalen May 1983 35 p refs
(Contract W-31-109-eng-38)
(DE84-001400; ANL/NDM-80) Avail: NTIS HC A03/MF A01

Neutron total cross sections were measured for 26 elements. Data were obtained in the energy range from 47 keV to 20 MeV for 11 elements in the range of light mass fission products. Previously reported measurements for eight heavy and actinide isotopes were extended to 20 MeV. Data were also obtained for Cu (47 keV to 1.4 MeV) and for Sc, Zn, Nd, Hf, and Pt (1.8 to 20 MeV). Accurate neutron total cross sections for evaluations and for optical model parameterizations are provided. The latter are required for the derivation of other nuclear data information of importance to applied programs. DOE

N84-13971# California Univ., Irvine. Dept. of Chemistry.
INTERMOLECULAR ENERGY-TRANSFER PROCESSES Final Technical Report, 1 May 1979 - 31 Mar. 1983
Edward K. C. Lee 10 Oct. 1983 29 p refs

(Contracts DE-AT03-76ER-70217; EY-76-S-03-0034; AT-(0-4-3)-34)
(DE84-000334; DOE/ER-70217/T1) Avail: NTIS HC A03/MF A01

Equipment used for the fluorescence excitation and emission spectroscopy are described. The following were studied: singlet electronic energy transfer, photophysics of single vibrational levels (H2CO), photophysics of single rotational levels (H2CO and SO2), rotation-vibration interaction by Coriolis perturbation, and matrix isolation photochemistry and spectroscopy (SO2, H2CO, H2C2O2). DOE

N84-13972# California Univ., Livermore. Lawrence Livermore Lab. Atomic and Molecular Theory Group.
RESONANCE-RESONANCE COUPLING IN DISSOCIATIVE ELECTRON ATTACHMENT
A. U. Hazi 14 Oct. 1983 13 p refs Presented at the Intern. Symp. on Wavefunctions and Mech. from Electron Scattering Processes, Castelgandolfo, Italy, 24-26 Jul. 1983
(Contract W-7405-eng-48)
(DE84-001767; UCRL-89541; CONF-8307103-2) Avail: NTIS HC A02/MF A01

The effects of resonance-resonance coupling on dissociative electron attachment (DA) are discussed. Some typical experimental results, and the two alternative theoretical interpretations which were proposed are reviewed. The main features of a theory which involves indirect electronic coupling between the resonances and how it can be applied to the formation of H(+) by electron attachment to HBr are presented. In the case of hydrogen halides (HX), DA provides information about the wavefunctions of the two HX(+) resonances and the extent of spin-orbit mixing between them. DOE

N84-13973# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
VIBRATIONAL SPECTROSCOPY OF CHEMISORBED MOLECULES BY INFRARED EMISSION
S. Chiang, R. G. Tobin, and P. L. Richards Aug. 1983 25 p refs Presented at the Am. Vacuum Soc. Meeting, Boston, 1-4 Nov. 1983
(Contract DE-AC03-76SF-00098)
(DE84-000956; LBL-15868; CONF-831171-7) Avail: NTIS HC A02/MF A01

The technique of infrared emission spectroscopy was developed in order to observe vibrational modes of molecules adsorbed on clean, single crystal metal surfaces. An apparatus was constructed which measures the emission from a single crystal sample in thermal equilibrium at room temperature. The apparatus consists of a liquid helium cooled infrared grating spectrometer coupled to an ultrahigh vacuum system equipped with surface preparation and characterization facilities. The system is capable of measuring over the frequency range from 330 to 3000 cm(-1) with a resolution of 1 to 15 cm(-1). Using this technique, the linewidths of both the carbon-metal and carbon-oxygen stretching vibrations of monolayer coverage of CO on Ni(100) were measured. DOE

N84-13974# Brookhaven National Lab., Upton, N. Y. Chemistry Dept.
TRENDS IN EXOTIC-ATOM RESEARCH
Richard M. Lambrecht and Dezso Horvath (British Columbia Univ.) 1983 10 p refs Presented at the Yamada Conf. on Muon Spin Rotation and Assoc. Problems, Shimoda, Japan, 18 Apr. 1983
(Contract DE-AC02-76CH-00016)
(DE84-001679; BNL-33793; CONF-830455-9) Avail: NTIS HC A02/MF A01

An attempt was made to analyze the trends in the development of exotic atom research on the basis of a recently compiled bibliography. The analysis of nearly 4000 publications demonstrated that: (1) exotic atoms are nuclear probes used in every field of physics, from the test of quantum electrodynamics (QED) to chemical physics, to materials sciences; (2) the role of nuclear and atomic physics in exotic atom research is decreasing (although it is still significant), while that of materials sciences and chemical physics is exponentially increasing; and (3) prior to 1980 most investigators were mainly interested in atoms with negative muons, while during the last few years the positive muon (mu SR) studies have dominated exotic atom research. DOE

N84-13975# Wright State Univ., Dayton, Ohio. Dept. of Chemistry.
INVESTIGATION OF THE DYNAMICS AND THRESHOLD BEHAVIOR OF ENDOTHERMIC NEGATIVE ION-NEUTRAL REACTIONS Final Report, 15 Jul. 1980 - 14 Jul. 1983
T. O. Tiernan and R. L. C. Wu 1 Aug. 1983 80 p refs
(Contract DE-AC02-80ER-10668)
(DE84-001369; DOE/ER-10668/3) Avail: NTIS HC A05/MF A01

The studies yielded thermochemical and scattering data which are needed for understanding the ion chemistry of plasmas, and in the development of certain devices which utilize plasmas, such as MHD generators. The characteristics of various negative ion sources, including conventional electron impact, sputtering and glow discharge sources, were extensively explored. Energy thresholds for selected collision induced dissociation reactions involving PO(-) energies, heats of formation and electron affinities of the corresponding neutral molecules were derived from these data. In addition, energy thresholds for endothermic electric transfer reactions involving PO(-), PO2(-), CO2(-), FeO2(-), BO(-), BO2(-), MoO(-), MoO2(-), MoO3(-), WO2(-), and WO3(-) were determined, and again, these data were utilized to calculate electron affinities of the corresponding molecular species. A crossed ion molecular beam scattering apparatus was used to investigate the kinetics, dynamics and energy transfer characteristics of the negative ion neutral reactions, O(-) + H2(D2) yields OH(-)(OD(-)) + H(D) in very low translational energy regime. DOE

N84-13976# Stanford Linear Accelerator Center, Calif.
PHYSICS WITH POLARIZED BEAMS IN e+e(-) COLLIDERS
Charles Y. Prescott May 1983 7 p refs Presented at the Europhys. Study Conf. on Electroweak Effects at High Energies, Erice, Italy, 1-10 Feb. 1983
(Contract DE-AC03-76SF-00515)
(DE83-016441; SU-SLAC-PUB-3120; CONF-830231-4) Avail: NTIS HC A02/MF A01

The spin structure of the standard model of electroweak interactions is described, with emphasis on the relevance to polarized beam phenomena. The polarization dependence of the cross section, charge asymmetries, and examples of experimental measurements using longitudinal polarization are given. Longitudinal beam polarization is discussed in some detail, including electroweak radiative corrections. Applications to testing the standard model and looking beyond for additional gauge bosons are considered. DOE

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N84-13977# Sandia Labs., Albuquerque, N. Mex.
GRAD-B DRIFT TRANSPORT OF HIGH CURRENT ELECTRON BEAMS
J. R. Lee, R. C. Backstrom, J. A. Halbleib, and T. P. Wright 1983 5 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12 Sep. 1983
(Contract DE-AC04-76DP-00789)
(DE84-000115; SAND-83-1773C; CONF-830911-15) Avail: NTIS HC A02/MF A01

Grad-B transport, bunching and focusing of relativistic electron beams was proposed as a method of increasing the power delivered to an ICF target by an order of magnitude. Recent experiments demonstrated the efficient transport of high current electron beams

over 1.0 m distance in the 1/r azimuthal magnetic field of a current-carrying wire. The electron drift velocity was measured as a function of wire current and found to be in good agreement with theory. Measurements of X-ray production in a tantalum target were used as a diagnostic tool to study transport efficiency. A theoretical model of the experiment was developed to calculate bremsstrahlung production in the target, assuming 100 percent transport efficiency. This model predicted radial X-ray dose profiles in the experimental converter assembly which were in good agreement with the measurements. DOE

N84-13978*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A SIMPLE MODEL OF SPACE RADIATION DAMAGE IN GaAs SOLAR CELLS
John W. Wilson, John J. Stith (Virginia State Univ., Petersburg), and L. V. Stock (Old Dominion Univ., Norfolk, Va.) Dec. 1983 31 p refs
(NASA-TP-2242; L-15689; NAS 1.60:2242) Avail: NTIS HC A03/MF A01 CSCL 20H

A simple model is derived for the radiation damage of shallow junction gallium arsenide (GaAs) solar cells. Reasonable agreement is found between the model and specific experimental studies of radiation effects with electron and proton beams. In particular, the extreme sensitivity of the cell to protons stopping near the cell junction is predicted by the model. The equivalent fluence concept is of questionable validity for monoenergetic proton beams. Angular factors are quite important in establishing the cell sensitivity to incident particle types and energies. A fluence of isotropic incidence 1 MeV electrons (assuming infinite backing) is equivalent to four times the fluence of normal incidence 1 MeV electrons. Spectral factors common to the space radiations are considered, and cover glass thickness required to minimize the initial damage for a typical cell configuration is calculated. Rough equivalence between the geosynchronous environment and an equivalent 1 MeV electron fluence (normal incidence) is established. Author

N84-13979# Rockwell International Corp., Calif. Energy Systems Group.
SPACE REACTOR SYSTEM AND SUBSYSTEM INVESTIGATIONS: ASSESSMENT OF TECHNOLOGY ISSUES FOR THE REACTOR AND SHIELD SUBSYSTEM, SP-100 PROGRAM
D. F. Atkins and A. F. Lillie 30 Jun. 1983 37 p
(Contract DE-AT03-82SF-11687)
(DE84-001566; ESG-DOE-13408) Avail: NTIS HC A03/MF A01

Preliminary assessment was completed of nuclear technology as it relates to candidate reactor/shield subsystems for the SP-100 Program. The scope of the assessment was confined to the nuclear package (to the reactor and shield subsystems). Nine generic reactor subsystems were addressed for the assessment. DOE

N84-13980# Argonne National Lab., Ill.
PROCEEDINGS OF THE SUMMER WORKSHOP ON PROTON DECAY EXPERIMENTS
David S. Ayres, ed. 1982 494 p refs Workshop held in Argonne, Ill., 7-11 Jun. 1982
(Contract W-31-109-eng-38)
(DE83-009572; ANL-HEP-CP-82-24; CONF-8206123) Avail: NTIS HC A21/MF A01

Separate abstracts were prepared for 18 of the 21 papers presented. Three papers were previously included in the data base. Also included in the proceedings are a workshop summary, working group reports, and a report of the Technical Assessment Panel on Proton Decay. DOE

N84-13981# National Academy of Sciences - National Research Council, Washington, D. C. Subcommittee on Nuclear and Radiochemistry.
SEPARATED ISOTOPES: VITAL TOOLS FOR SCIENCE AND MEDICINE
1982 275 p refs Presented at the National Research Council Workshop on Stable Isotopes and Derived Radioisotopes, Washington, D.C., 3 Feb. 1982
(Contract FG01-81ER-10984)
(DE83-011646; CONF-820233-Summ) Avail: NTIS HC A12/MF A01

Deliberations and conclusions of a workshop on stable isotopes and derived radioisotopes organized by the Subcommittee on Nuclear and Radiochemistry of the National Research Council's Committee on Chemical Sciences at the request of the Department of Energy (DOE) are summarized. The workshop was jointly supported by the National Institutes of Health and DOE's Office of Basic Energy Sciences. An overview with three recommendations resulting from the workshop is followed by reports of the four workshop panels. Background papers were prepared by individuals on the Steering Committee and made available to all participants prior to the Workshop. They are reproduced as Appendixes 3 to 8. Short reports on alternate separation techniques were presented at the Workshop and are reproduced in Appendixes 9 to 11. DOE

N84-13982# Brookhaven National Lab., Upton, N. Y.
MAGNETIC FIELD MEASUREMENTS OF SUPERCONDUCTING MAGNETS FOR THE COLLIDING BEAM ACCELERATOR
J. Herrera, H. Kirk, A. Prodell, and E. Willen 1983 7 p refs Presented at the 12th Intern. Conf. on High Energy Accelerators, Batavia, Ill., 11-16 Aug. 1983
(Contract DE-AC02-76CH-00016)
(DE83-017351; BNL-33487; CONF-830822-20) Avail: NTIS HC A02/MF A01

An important aspect of the development and production of superconducting magnets for the Colliding Beam Accelerator (CBA) is the measurement of the magnetic field in the aperture of these magnets. The measurements have the three-fold purpose of determining the field quality as compared to the lattice requirements of the CBA, of obtaining the survey data necessary to position the magnets in the CBA tunnel, and lastly, of characterizing the magnetic fields for use in initial and future orbit studies of the CBA proton beams. Since for a superconducting storage accelerator it is necessary to carry out these detailed measurements on many (approx. 1000) magnets and at many current values (approx. 1000), in agreement with previous experience, a system which Fourier analyzes the voltages induced in a number of rotating windings and thereby obtains the multipole field components was developed. The important point is that such a measuring system is fast and precise. Horizontal measurements of the CBA ring dipoles was used. DOE

N84-13983# Fermi National Accelerator Lab., Batavia, Ill.
ELECTRICAL AND MAGNETIC PROPERTIES OF THE ENERGY-SAVER CORRECTION ELEMENTS
M. Johnson, A. McInturff, R. Raja, and P. Mantsch Aug. 1983 10 p refs Presented at the 12th Intern. Conf. on High Energy Accelerators, Batavia, Ill., 11-16 Aug. 1983
(Contract DE-AC02-76CH-03000)
(DE83-017327; FERMILAB/TM-1205; CONF-830822-14) Avail: NTIS HC A02/MF A01

The lattice of the Fermi National Accelerator Laboratory's Energy Saver/Doubler contains a group of superconducting correction windings associated with each quadrupole. These are housed in an element referred to as a spool. There are 192 spools in the ring plus 12 special power spools which contain the main buss 5000 ampere power input as well as correction elements. There will be constructed and tested 290 spools, including spares of each of the eight different types. There were 266 individual spools tested to date. The spools were tested for (1) magnetic field quality, harmonic moments, transfer constants and coil angles, (2) high voltage integrity, (3) critical transport current, and (4) cryogenic operating characteristics (i.e., heatloads, thermometry calibration checks, etc.). Data are summarized for 318 cryogenic tests and magnetic field quality of the 266 different spools, which contain 1614 correction magnet coils. DOE

N84-13984# Rockwell International Corp., Calif. Energy Systems Group.
SPACE-REACTOR SYSTEM AND SUBSYSTEM INVESTIGATIONS: COST AND SCHEDULE ESTIMATES FOR REACTOR

AND SHIELD SUBSYSTEMS TECHNOLOGY DEVELOPMENT. SP-100 PROGRAM
W. R. Determan, R. B. Harty, and C. Hylin 30 Jun. 1983 13 p (Contract DE-AT03-82SF-11687)
(DE84-000112; ESG-DOE-13407) Avail: NTIS HC A02/MF A01

Cost and schedule estimates of the technology development for reactor and shielding subsystems of a 100-kWe class space reactor electric system are presented. The subsystems technology development (which includes reactor and shield subsystems ground testing) is supported by materials and processes development and component development. For the purpose of the cost estimate, seven generic types of reactor subsystems were used: uranium-zirconium hydride, NaK-cooled thermal reactor; lithium-cooled, refractory-clad fast reactors; Na- or K-cooled fast reactor; in-core thermionic reactor; inert gas-cooled particle fuel reactor; inert gas-cooled metal-clad fast reactor; and heat pipe-cooled fast reactor. Also three levels of technology were included for each of the generic types of reactor subsystem: current, improved, and advanced. The data in this report encompass all these technology levels. The shielding subsystem uses both gamma (heavy-metal) and neutron (hydrogenous material) shields. The shields considered would be used in conjunction with unmanned payloads. DOE

74 OPTICS

Includes light phenomena.

N84-13985*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
BAFFLE SYSTEM EMPLOYING REFLECTIVE SURFACES
William I. Linlor Dec. 1983 34 p refs
(NASA-TM-84406; A-9480; NAS 1.15:84406) Avail: NTIS HC A03/MF A01 CSCL 20F

Reflective baffles are proposed to reject off-axis light entering a telescope. Toroidal surfaces and adjacent cones are positioned so that off-axis rays make multiple reflections between these two surfaces. Meridional rays are reflected approximately parallel to the entering direction. Skew rays are reflected obliquely, but leave the telescope aperture. The range of incident angles for which these reflections are obtained is approximately 45 deg. A system is described that is designed specifically for the Space Shuttle Infrared Telescope Facility (SIRTF). Because of its reflective properties, the proposed baffle system rejects about 90 deg of the heat load from the SIRTF sunshade that would be absorbed in systems of conventional black baffles. Author

N84-13986# Naval Research Lab., Washington, D. C. Atmospheric Physics Group.
OPTICAL PROPERTIES OF THE MARINE AEROSOL AS PREDICTED BY A BASIC VERSION OF THE NAVY AEROSOL MODEL Interim Report
S. G. Gathman 2 Sep. 1983 35 p
(F59551697)
(AD-A132411; NRL-MR-5157) Avail: NTIS HC A03/MF A01 CSCL 20/6

A model is presented which predicts optical and infrared extinction and absorption from marine aerosol for wavelengths of 0.2 to 40 micrometers. The model utilizes standard meteorological measurements as inputs but has default values built into it so that input values are not absolutely necessary but when they are available they will increase the accuracy of the predictions. The model is based on aerosol size distribution measurement data taken by several investigators from platforms close to the sea surface. The optical predictions of the model are derived from precalculated terms stored in the program which were originally obtained from lengthy Mie calculations on special aerosol size distributions. Author (GRA)

N84-13987# Pattern Analysis and Recognition Corp., New Hartford, N.Y.
ADVANCED PATTERN RECOGNITION Final Technical Report, 30 Sep. 1980 - 30 Nov. 1982
James L. Cambier, Stephen Barth, William J. Reid, and Scott A. Barrett Griffiss AFB, N.Y. RADC May 1983 131 p Original contains color illustrations
(Contract F30602-80-C-0319; AF Proj. 4594)
(AD-A132339; PAR-83-1; RADC-TR-83-50) Avail: NTIS HC A07/MF A01 CSCL 20/6

The Advanced Pattern Recognition effort has provided additional enhancements to the RADC Image Processing System (IPS) for developing a variety of techniques in performing target detection and identifications. These extensions include the extraction of features based on edge and region information in addition to the normal pixel classification methods. This capability now permits both statistical and symbolic classification of pixels and objects. Further improvements provide the ability to develop and apply artificial intelligence in the form of rules for extracting features automatically. Author (GRA)

N84-13988# Stanford Univ., Calif. Center for Materials Research.
PREPARATION OF INFRARED OPTIC FIBERS USING NEW MATERIALS Final Technical Report, 1 Oct. 1981 - 31 Mar. 1983
R. S. Feigelson and Roger K. Route Jul. 1983 47 p Submitted for publication
(Contract N00014-82-K-2001)
(AD-A132311; SU-CMR-83-9) Avail: NTIS HC A03/MF A01 CSCL 20/6

This report summarizes an eighteen-month program on the preparation and characterization of optical fibers which have low losses and are transparent in the infrared range. The objectives were to study preparative techniques, compositional and optical properties, and factors which influence fiber growth techniques. The emphasis of this program was on single crystal fibers in the size range from 100 - 1000 micrometer diameter. Single crystal fibers were produced in limited lengths using two techniques: the laser heated pedestal growth technique for high-melting materials, and the capillary-fed fiber growth method for low-melting and for volatile materials. The materials studied were selected from those which have a high potential for low loss at wavelengths greater than 1.5 micrometers, and included BaF2, CaF2, AgBr, and KRS-5. The fibers were analyzed using metallographic, optical, XRD, and energy dispersive analytical techniques. Critical system and growth parameters were studied, and factors which correlated with the occurrence of internal structural and optical defects were identified. This study demonstrated the feasibility of growing a range of IR fibers with both the laser-heated pedestal and the capillary-fed growth techniques. GRA

N84-13989# Naval Postgraduate School, Monterey, Calif.
CALCULATION OF ATMOSPHERIC TRANSMITTANCE BY IBM 3033 COMPUTER CODE LOWTRAN IIIB M.S. Thesis
Moon-Sik Shin Jun. 1983 102 p
(AD-A132123; AD-E850405) Avail: NTIS HC A06/MF A01 CSCL 20/6

LOWTRAN IIIB is a FORTRAN computer program for prediction of atmospheric optical transmittance, developed at the U.S. Air Force Geophysics Laboratory (AFGL). The LOWTRAN IIIB was received in the modified form developed by naval weapons center China Lake for use on the UNIVAC 1110 computer, and has now been interfaced to the IBM 3033 computer. Due to complier storage limitation in the IBM computer, the atmospheric data are read into common storage at the beginning of the program. The two dimensional block data submodule has been replaced with a linear data array, and a new subroutine (array) written to reformat the data. The basic logic structure is unchanged. Comparisons of NPS LOWTRAN IIIB computations with direct optical extinctions measurement over Monterey Bay and at San Nicolas Island indicate that under these circumstances LOWTRAN IIIB underestimates the extinction due to aerosols while the computed molecular absorption is in substantial agreement with experiment. LOWTRAN IIIB is presently available as a method of predicting atmospheric transmittance at low resolutions at NPS and is suitable for

incorporation in simulations and studies of electrooptic weapon/sensor systems performance. GRA

N84-13990# California Univ., Livermore. Lawrence Livermore Lab.
FIBER OPTICS TEMPERATURE AND PRESSURE PROBE
T. Hirschfeld, F. Wang, G. Haugen, and G. Hieftje (Indiana Univ., Bloomington) 29 Sep. 1983 6 p refs Presented at the 26th ORNL-DOE Conf. on Anal. Chem. in Energy Technol., Knoxville, Tenn., 11-13 Oct. 1983
(Contract W-7405-eng-48)
(DE84-001785; UCRL-89262; CONF-831025-13) Avail: NTIS HC A02/MF A01

The half life, the line width, and the ratio of peak intensities of the R1 and R2 ruby lines are only a function of temperature, while the shift in line position and the absolute intensities are functions of both the pressure and temperature. The emission from an optical fiber with a ruby tip encodes both the temperature and pressure of the fiber tip. Both the temperature and the pressure can be deduced by analyzing this spectroscopic information. DOE

N84-13991# California Univ., Livermore. Lawrence Livermore Lab.
INSTRUMENTATION FOR REMOTE SENSING OVER FIBER OPTICS
T. Hirschfeld, G. Haugen, and F. Milanovich 29 Sep. 1983 7 p refs Presented at the 26th ORNL-DOE Conf. on Anal. Chem. in Energy Technol., Knoxville, Tenn., 11-13 Oct. 1983 Submitted for publication
(Contract W-7405-eng-48)
(DE84-001788; UCRL-89593; CONF-831025-12) Avail: NTIS HC A02/MF A01

The sensing and analytical abilities of the laser-fluorescence spectrometer was extended beyond the physical confines of the laboratory by means of communications-grade optical fibers. These fiber probes are extremely rugged, compared with sensitive laboratory equipment, and also extremely inexpensive. Sensitive chemical analyses may be performed in hostile environments without risking damage to the laser and the spectrometer. Special-purpose optrodes that are sensitive to selected chemicals were produced. With multiplexing, a number of fibers whose terminals are at widely scattered locations, gathering information in one central instrument without the expense and delay involved in manual sample gethering are scanned. A remote analyzer for monitoring rare earth ion migration in a nuclear-waste repository, an environment too hostile for any previous remote sensing device is being developed. Optrodes sensitive to a wide variety of non-chemical stimuli are being developed. DOE

N84-13992# California Univ., Livermore. Lawrence Livermore Lab.
DEPOSITION OF CESIUM IODIDE ON PAPYLENE
P. L. Tassano 31 Aug. 1983 9 p refs Presented at the Intern. Nucl. Target Soc. Conf., Eastsound, Wash., 7-10 Sep. 1983
(Contract W-7405-eng-48)
(DE83-017839; UCRL-89776; CONF-8309141-1) Avail: NTIS HC A02/MF A01

A technique developed for coating thin Parylene with thin films of cesium iodide is described. Results obtained in a comparative evaluation of these films with commercially produced films are presented. DOE

N84-13993# California Univ., Livermore. Lawrence Livermore Lab.
PRECISION SUPPORT OF ANNULAR OPTICS
J. W. Roblee, D. W. Stillman, and S. R. Patterson Aug. 1983 10 p refs Presented at the 27th Ann. Intern. Tech. Symp. on High Speed Photography, Videography and Photonics, San Diego, Calif., 21-26 Aug. 1983
(Contract W-7405-eng-48)
(DE83-017473; UCRL-89756; CONF-830874-23) Avail: NTIS HC A02/MF A01

A quantitative description of the deformation of annular optical element subject to external forces has been developed. Expressions applicable when the width of the element is small compared to its radius provide distortion data for both free rings and rings supported on thn wall cylinder segments (tangent flanges). This data may be used to guide the design of fixtures for diamond turning large annular optics. DOE

N84-13994# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
FAST, SELF-NULLING SPECTROSCOPIC ELLIPSOMETER: INSTRUMENTATION AND APPLICATION, REVISION
R. H. Muller and J. C. Farmer May 1983 15 p refs Presented at the Conf. on Ellipsometry and Other Opt. Methods for Surface and Thin Film Analysis, Paris, 7-10 Jun. 1983
(Contract DE-AC03-76SF-00098)
(DE83-015531; LBL-15918-Rev; CONF-8306116-1-Rev) Avail: NTIS HC A02/MF A01

The advantages of rapid spectral scanning have been combined with the inherent accuracy of a compensating ellipsometer operated in the polarizer compensator sample analyzer configuration. Wavelength is varied over the visible UV (370 to 720 nm) at a maximum rate of 114 nm/s by rotating a continuously variable interference filter. A three reflection Fresnel rhomb serves as the achromatic quarter wave compensator. A microcomputer is used to collect spectroscopic measurements, perform instrument calibrations, digital filtering and interpret data. Wavelength independent parameters of multiple film optical models have been determined by treating measurements of delta and psi at different wavelengths as independent measurements. Experimental and predicted ellipsometer measurements are compared by use of statistical techniques for the determination of optimum values and confidence limits of model parameters. DOE

N84-13995# California Univ., Livermore. Lawrence Livermore Lab.
CONSTRUCTION AND OPERATIONAL EXPERIENCE OF THE TANDEM MIRROR EXPERIMENT-UPGRADE (TMX-U)
A. K. Chargin, M. O. Calderon, and T. L. Moore 1 Jul. 1983 15 p refs Presented at the 9th Intern. Vacuum Congr. and 5th Intern. Conf. on Solid Surfaces, Madrid, 26 Sep. - 7 Oct. 1983 Submitted for publication
(Contract W-7405-eng-48)
(DE83-018181; UCRL-88987; CONF-8309103-8) Avail: NTIS HC A02/MF A01

The tandem mirror experiment-upgrade (TMX-U) incorporates two features: thermal barriers in the end plugs and injection of the neutral beams at several oblique angles. The thermal barriers isolate the electrons in the end plugs from those in the central cell, making it possible to heat them independently with microwaves. In addition, this innovation produces a large potential gradient in the end plugs with lower magnetic fields and lower neutral-beam energies than would be possible in a conventional tandem mirror device. The TMX-U is also designed to test neutral-beam-injection angles as an experimental parameter. Angles other than 900 are used to produce a plasma with improved microstability. DOE

N84-13407*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DEFORMABLE SUBREFLECTOR COMPUTED BY GEOMETRIC OPTICS
M. S. Katow, I. Khan, and W. F. Williams *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 65-78 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 20F

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N84-13996# Iowa Univ., Iowa City. Dept. of Physics and Astronomy.

OBSERVATIONS OF NONLINEAR BEHAVIOR IN A LOW-PRESSURE DISCHARGE COLUMN Progress Report, 1983
Steven L. Cartier and Robert L. Merlino Aug. 1983 31 p Submitted for publication
(Contract N00014-83-K-0452)
(AD-A132321; AD-F630051; U-OF-IOWA-83-25) Avail: NTIS HC A03/MF A01 CSCL 20/9

Sudden and abrupt jumps in the plasma density and discharge current of low-pressure magnetized argon and helium plasmas are observed. These jumps are found to depend on the discharge bias voltage, the neutral gas pressure, and the magnetic field strength and occur with a substantial hysteresis in those parameters. These jumps are accompanied by the onset of intense and coherent low-frequency plasma oscillations. In addition, under certain conditions, the radial density profile of the plasma is found to be significantly different following a jump. Some possibly related plasma instabilities are discussed. Author (GRA)

N84-13997# Minnesota Univ., Minneapolis. Center of Plasma Chemistry.
STUDY OF PLASMA CHEMISTRY AND PLASMA PROCESSING Final Technical Report, 15 Dec. 1979 - 15 Jun. 1983
H. J. Oskam 1983 347 p
(Contract N00014-80-C-0244)
(AD-A132207; AD-E750839) Avail: NTIS HC A15/MF A01 CSCL 20/9

The final technical report describes studies related to plasma chemistry and plasma processing funded by the Office of Naval Research during the period December 15, 1979-June 15, 1983 (Contract: N00014-80-C-0244, NR SRO-016). Two experimental systems needed for a detailed study of plasma etching and plasma deposition of thin films were constructed. A detailed study was made of the plasma processing of polymer films. Another part of the studies involved an investigation of the basic mechanisms important in the volume synthesis of materials. The three related areas of research mentioned are described in detail. The resulting scientific publications and presentations at conferences, as well as the personnel involved are given in appendices. Author (GRA)

N84-13998# California Univ., Los Angeles. Center for Plasma Physics and Fusion Engineering.
PONDEROMOTIVE EFFECTS IN NONNEUTRAL PLASMAS
B. M. Lamb and G. J. Morales May 1983 42 p
(Contract N00014-76-C-0476)
(AD-A132109; AD-E800784; PPG-711) Avail: NTIS HC A03/MF A01 CSCL 20/9

Nonlinear wave effects in plasmas fall into two broad categories: wave-particle interactions and fluid nonlinearities. For waves whose phase velocities are much larger than the average thermal velocities of all particle species, the wave-particle interaction plays an insignificant role. In such systems the fluid nonlinearities are primarily responsible for the modification of the zero order plasma equilibrium as the wave amplitude is increased beyond the linear regime. The subject of this paper falls into the latter class. Among the numerous fluid nonlinearities associated with a large amplitude, high frequency, electrostatic wave, there are two effects of overwhelming importance: parametric instabilities and ponderomotive force density modifications. In conventional neutral plasmas both of these can appear simultaneously and lead to ir.teresting physical effects which have been extensively investigated theoretically and experimentally. However, in single species plasmas, i.e., nonneutral plasmas, the parametric instability channel is not readily available because there is only a single mass present. Consequently, in these systems it is expected that the first nonlinear effect to appear is modification of the zero order density by the ponderomotive force. This is the specific issue that is considered in this work. GRA

N84-13999# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.
RESONANT-3-WAVE MODE COUPLING IN INHOMOGENEOUS PLASMAS: SYMMETRY BREAKING BY OMEGA MESON-*
J. R. Myra and D. A. Dippolito Aug. 1983 21 p refs
(Contract DE-AC03-76ET-53057)
(DE84-001633; SAI-83-1034/PRI-65) Avail: NTIS HC A02/MF A01

The general frequency gyrokinetic formalism is used to obtain expressions for the electrostatic flute mode resonant three wave coupling coefficients in a warm magnetized plasma with a cross field density gradient. In the infinite homogeneous plasma limit, the coefficients assume a particularly simple form which is manifestly symmetric under all permutations of the three waves. This symmetry is broken for the inhomogeneos cause when (NU)/sub */ terms are retained. As a consequence, it is shown that three ion Bernstein modes can satisfy the conditions for explosive instability. DOE

N84-14000# Oak Ridge National Lab., Tenn. Fusion Energy Div.
AMBIPOLARITY AND TRANSPORT WITH RESONANT ION DIFFUSION IN EBT
E. F. Jaeger, C. L. Hedrick, D. E. Hastings, and J. S. Tolliver Oct. 1983 33 p refs
(Contract W-7405-eng-26)
(DE84-000333; ORNL/TM-8806) Avail: NTIS HC A03/MF A01

Using recently derived analytic expressions for resonant and nonresonant neoclassical transport coefficients in EBT, the ambipolar potential required to maintain quasi-charge neutrality in the presence of a high energy ion tail produced by nonclassical heating was calculated. The electric field obeys a differential rather than an algebraic equation. Solution of this equation gives a potential proportional to the local magnetic field strength and thus a rigid rotation of low energy ions near the magnetic axis. Radial transport calculations using this potential give improved agreement with experimental data for neutral density and particle lifetime. However, high energy ion orbits in the calculated potential exhibit banana widths larger than assumed in the resonant transport theory. The required density of high energy ions is therefore larger than would be expected if realistic banana widths could be included. DOE

N84-14001# Oak Ridge National Lab., Tenn. Physics Energy Div.
EXPERIMENTAL RESULTS ON FINITE-BETA LIMITS AND TRANSPORT IN THE ISX-B TOKAMAK
S. C. Bates, C. E. Bush, B. A. Carreras, W. A. Cooper, J. L. Dunlap, P. H. Edmonds, O. C. Eldridge, A. C. England, W. L. Gardner, J. T. Hogan et al Oct. 1983 53 p refs
(Contract W-7405-eng-26)
(DE84-000258; ORNL/TM-8750) Avail: NTIS HC A04/MF A01

A summary of experimental results pertaining to plasma energy and particle transport in the Impurity Study Experiment (ISX-B) tokamak is presented. Emphasis is placed on results with neutral beam heating, usually in the codirection (aligned with the plasma current), and the relative roles of various energy loss mechanisms are discussed. The derived electron thermal diffusivity and the predictions of various models were compared. The measured values are within a factor of 2 of the values expected to result from resistive pressure-driven modes. Evidence for the presence of these modes is discussed. Values of ion thermal diffusivity are compared with the predictions of neoclassical theory. Anomaly factors (the ratio of experimental value to theoretical value) between 1 and 5 are found. Comparisons between experimental results and theoretical predictions are also made for cases with increased toroidal field ripple, produced by using only 9 of the 18 toroidal field coils. Convection is shown to play a small role in energy transport, except at the plasma periphery. DOE

N84-14002# Oak Ridge National Lab., Tenn.
A PRACTICAL SUBLIMATION SOURCE FOR LARGE-SCALE CHROMIUM GETTERING IN FUSION DEVICES
J. E. Simpkins, L. C. Emerson, and P. K. Mioduszewski 1983 14 p refs Presented at the 3rd Topical Meeting on Fusion Reactor

Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract W-7405-eng-26)
(DE84-000724; CONF-830942-20) Avail: NTIS HC A02/MF A01

The technique of chromium gettering with a large scale sublimation source which resembles in its design the VARIA Ti-Ball is described. The gettering technique is outlined. The experimental arrangement consists of an UHV system instrumented for total and partial pressure measurements, a film thickness monitor, thermocouples, an optical pyrometer, and appropriate instrumentation to measure the heating power. It is shown that the temperature and corresponding sublimation rate of the Cr-Ball is a function of input power. An example of the total pumping speed of a gettered surface is shown. DOE

N84-14003# Los Alamos Scientific Lab., N. Mex.
SIMULATIONS OF THE EFFECTS OF MOBILE IONS ON THE RELATIVISTIC BEAM-PLASMA INSTABILITY FOR INTENSE BEAMS
Michael E. Jones, Don S. Lemons, and Huan Lee 1983 5 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12 Sep. 1982
(Contract W-7405-eng-36)
(DE84-000369; LA-UR-83-2601; CONF-830911-26) Avail: NTIS HC A02/MF A01

Particle-in-cell simulations of the beam-plasma instability for intense relativistic electron beams in dense plasmas show rapid heating of the electrons to multi-kilovolt temperatures. The resulting hydrodynamic motion of the plasma results in density gradients that degrade the interaction. Heat flow out of the plasma is found in some instances to limit the gradient formation process. DOE

N84-14004# Oak Ridge National Lab., Tenn. Solid State Div.
ION-BEAM SURFACE ANALYSIS IN PLASMA-EDGE STUDIES
R. A. Zuhr, J. B. Roberto, and B. R. Appleton Oct. 1983 126 p refs Submitted for publication
(Contract W-7405-eng-26)
(DE84-001578; ORNL/TM-8815) Avail: NTIS HC A07/MF A01

The application of ion beam surface analysis techniques to plasma edge fusion devices is reviewed. Methods of ion beam analysis for the quantitative determination of the species, concentration, and depth distribution of atoms collected on surface probes or other exposed surfaces in the plasma edge are described. The interpretation of these data in terms of plasma edge parameters such as particle fluxes and energies and surface modification is discussed. Plasma edge experiments using ion beam surface analysis are reviewed and compared with techniques involving other surface spectroscopies and electrical and optical probes. DOE

N84-14005# Los Alamos Scientific Lab., N. Mex.
ENERGETIC PLASMA-BEAM PROPAGATION IN WEAK AND STRONG MAGNETIC FIELDS
William R. Shanahan 1983 5 p refs Presented at the 5th Intern. Topical Conf. on High-Power Electron and Ion-Beam Res. and Technol., San Francisco, 12-14 Sep. 1983
(Contract W-7405-eng-36)
(DE84-001362; LA-UR-83-2580; CONF-830911-24) Avail: NTIS HC A02/MF A01

Dynamical aspects of a relativistic plasma beam propagating across a magnetic field are investigated through two and three dimensional particle in cell numerical simulations. In the two dimensional simulations, different aspects of the physics are revealed by placing the initial ambient field perpendicular to and within the plane of calculation. In the former case the expected beam polarization appears at early times in the simulations but is quickly dominated by collectively induced heating. In the second geometry effects of magnetic field deformation appear. The consequences of allowing variation in the third dimension are briefly discussed. DOE

N84-14006# Illinois Univ., Urbana. Fusion Studies Lab.
CTR PLASMA ENGINEERING STUDIES Annual Progress Report, 1 Nov. 1982 - 30 Oct. 1983
George H. Miley 1983 91 p refs
(Contract DE-AC02-76ET-52040)
(DE84-001279; DOE/ET-52040/T17; COO-2218-295) Avail: NTIS HC A05/MF A01

Alternate confinement concepts are discussed, especially those involving field reversal. This work includes: study of possible steady-state operation of the Reversed Field pinch (RFP) via driven dynamo action, the development of particle and energy confinement scaling for the RFP and the Field Reversed Theta Pinch (FRTP), and analysis of start-up (heating and plasma build) for the spheromak and Field Reversed Mirror (FRM). In addition, a block of projects were concerned with fusion product heating and the possible effects of fusion product-driven instability. These include: effects of alpha-driven microinstabilities on heating in Tokamaks, exploratory studies of loss-cone-driven fusion product instabilities in tandem mirrors, and fusion product transport, including effects of large angle scattering in reversed field devices such as the FRM. DOE

N84-14007# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.
LOCALLY OMNIGENOUS TANDEM-MIRROR DESIGN
D. A. Dippolito, G. L. Francis, and J. R. Myra Aug. 1983 13 p refs
(Contract DE-AC03-76ET-53057)
(DE84-001605; SAI-83-1033/PRI-64) Avail: NTIS HC A02/MF A01

A simple tandem mirror coil system is found which has the property that the geodesic curvature of the paraxial magnetic field is locally small everywhere. This design approaches the ideal of a locally omnigenous configuration in which the particle drift surfaces coincide with the magnetic flux surfaces. Thus, radial losses due to resonant ion and stochastic radial diffusion are minimized. Plasma distortion due to central cell parallel currents and instability due to trapped particles are also greatly reduced. The advantages and disadvantages of the design for reactor applications are discussed. DOE

N84-14008# Oak Ridge National Lab., Tenn. Computer Sciences Dept.
INVERSE PLASMA EQUILIBRIA
H. R. Hicks, R. A. Dory, and J. A. Holmes 1983 29 p refs Presented at the 2nd European Workshop on Computational Probl. in the Calculation of MHD Equilibria, Wildhaus, Switzerland, 12 Sep. 1983
(Contract W-7405-eng-26)
(DE84-000723; CONF-8309137-3) Avail: NTIS HC A03/MF A01

A 2D inverse equilibrium solver that was constructed to analyze Tokamak configurations and stellarators is presented. To ensure that the method is suitable not only to determine equilibria, but also to provide appropriately represented data for existing stability codes, it is important to be able to control the Jacobian, tilde J is identical to delta(R,Z)/delta(rho, theta). The form chosen is tilde J = J0(rho)R-sup 1/rho where rho is a flux surface label, and 1 is an integer. The initial implementation is for a fixed conducting wall boundary, but the technique can be extended to a free boundary model. DOE

N84-14009# California Univ., Livermore. Lawrence Livermore Lab.
EVOLUTION OF THE MIRROR MACHINE
C. C. Damm 18 Aug. 1983 29 p refs Presented at the Am. Vacuum Soc. Meeting, Boston, 1-4 Nov. 1983
(Contract W-7405-eng-48)
(DE83-016942; UCRL-89277; CONF-831171-1) Avail: NTIS HC A03/MF A01

The history of the magnetic-mirror approach to a fusion reactor is primarily the history of our understanding and control of several crucial physics issues, coupled with progress in the technology of heating and confining a reacting plasma. The basic requirement of an magnetohydrodynamic-stable plasma equilibrium was achieved following the early introduction of minimum-B multipolar magnetic fields. In refined form, the same magnetic-well principle carries over to our present experiments and to reactor designs.

The higher frequency microinstabilities, arising from the non-Maxwellian particle distributions inherent in mirror machines, gradually came under control as theoretical prescriptions for distribution functions where applied in the experiments. Even with stability, the classical plasma leakage through the mirrors posed a serious question for reactor viability until the principle of electrostatic axial stoppering was applied in the tandem mirror configuration. Experiments to test this principle successfully demonstrated the substantial improvement in confinement predicted. DOE

N84-14010# Sandia Labs., Albuquerque, N. Mex.
ANALYSIS OF MECHANISMS FOR ANODE PLASMA FORMATION IN ION DIODES
M. A. Sweeney, J. E. Brandenburg, R. A. Gerber, D. J. Johnson, J. M. Hoffman, P. A. Miller, J. P. Quintenz, S. A. Slutz, and K. W. Bieg 1983 6 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12 Sep. 1983
(Contract DE-AC04-76DP-00789)
(DE83-017793; SAND-83-0564C; CONF-830911-6) Avail: NTIS HC A02/MF A01

Understanding how anode plasma is formed in intense pulsed power ion diodes by insulator breakdown is important in assessing the effect on ion beam quality. Formation of a passive flashover anode plasma source may involve one or more of the following: polarization of the anode dielectric, direct leakage electron bombardment, UV-stimulated desorption of excited gas in the gap or on the anode surface, ionization of desorbed neutrals in a surface plasma by electron return currents associated with ion extraction, or bombardment by low energy electrons or negative ions. At Sandia National Laboratories experiments have been done on Nereus, PI 110A, Proto I, Proto II, HydraMITE, and PBFA I using anodes with dielectric filled surfaces. The experiments represent a variety of anode turn on delays (2 to 15 ns), magnetic field strengths (7 to 30 kG), voltages (300 keV to 2 MeV), and anode configurations. Data include ion beam current from Faraday cups, holographic observation of plasma action, the spatial and temporal character of visible light emitted from the plasma, and optical metallographic examination of the dielectric. DOE

N84-14011# Argonne National Lab., Ill.
NEUTRON MEASUREMENTS AND RADIATION DAMAGE CALCULATIONS FOR FUSION MATERIALS STUDIES
L. R. Greenwood 1983 5 p refs Presented at the Am. Nucl. Soc. Winter Meeting, San Francisco, 30 Oct. 1983
(Contract W-31-109-eng-38)
(DE83-014790; CONF-831047-55) Avail: NTIS HC A02/MF A01

Fusion reactors will generate intense neutron fields, especially at the inner surfaces of containment vessels. With a typical wall loading of 1 MW/sq m, the yearly neutron fluence will be about 10 to the 26th power n/sq m. In a material like stainless steel this irradiation will produce about 10 atomic displacements per atom (DPA), 100 appM helium, 500 appM hydrogen, and various other transmutations. The gas to DPA ratios are very high compared to fission reactors due to the 14 MeV neutrons from the d-t fusion reaction. No existing neutron source can produce both the high fluence and high gas rates needed to simulate fusion damage. Consequently, fusion material studies are underway in a variety of facilities including fission reactors and accelerator based neutron sources. A Subtask Group has been created by DOE to characterize these diverse facilities in terms of neutron flux and energy spectrum and to calculate DPA and transmutation for specific irradiations. Material property changes can then be correlated between facilities and extrapolated to fusion reactor conditions. DOE

N84-14012# Sandia Labs., Albuquerque, N. Mex.
OVERVIEW OF ION-DIODE RESEARCH
Paul A. Miller 1983 7 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12 Sep. 1983
(Contract DE-AC04-76DP-00789)
(DE83-017791; SAND-83-0609C; CONF-830911-4) Avail: NTIS HC A02/MF A01

The generation of intense proton beams was studied using applied-B, hybrid, and pinch reflex ion diodes in an effort to determine the ion diode configuration which maximizes the probability of achieving target ignition of PBFA II. Diodes of all three types were tested and compared on PBFA I and elsewhere. Scaling calculations were carried out. Data were obtained about diode efficiency, impedance behavior, microscopic and global divergence, ion transport and neutralization, and MITL-diode coupling. Diagnostic techniques were developed. Results of diode comparisons and an overview of the diode research are presented. DOE

N84-14013# Los Alamos Scientific Lab., N. Mex.
HIGH-DENSITY Z-PINCH RESEARCH
J. S. Schlachter 1983 5 p refs Presented at 3rd Intern. Workshop on Plasma Focus Res., Stuttgart, 12 Sep. 1983
(Contract W-7405-eng-36)
(DE83-017311; LA-UR-83-2311; CONF-8309147-1) Avail: NTIS HC A02/MF A01

The linear zeta pinch is a plasma configuration which in its simplest form requires no auxiliary magnetic field; an axial current carried by the plasma produces an azimuthal confining field and provides ohmic (resistive) or implosion heating. The Lawson criterion (n tau > 10(2)0 m(+3)s) and high temperatures (T < 10 keV) must be simultaneously satisfied in any reactor scheme. Early zeta-pinch experiments concentrated on the sub-atmospheric fill pressure regime, with 10(19) m(+3) < n < 10(23) m(+3) and a corresponding confinement time constraint of 10(1) s < tau > 10(+4) s. In addition, these studies involved plasmas formed at the surface of an insulating wall; the plasmas were subsequently pinched inward by the radial j x beta force. Following the implosion phase, gross MHD instabilities were invariably observed on a time scale short compared to the required confinement time. DOE

N84-14014# General Atomic Co., San Diego, Calif.
LOW-ACTIVATION FUSION-REACTOR DESIGN STUDIES
G. R. Hopkins, E. T. Cheng, R. L. Creedon, I. Maya, K. R. Schultz, P. Trester, and C. P. C. Wong Jun. 1983 7 p refs Presented at the 5th Topical Meeting on Technol. of Fusion Energy, Knoxville, Tenn., 26-28 Apr. 1983 Submitted for publication
(Contract DE-AT03-76ET-51011)
(DE83-017688; GA-A-17018; CONF-830406-108) Avail: NTIS HC A02/MF A01

A design study for a low-activation Tokamak fusion reactor based on the STARFIRE baseline design was done. The major components of limiter, first wall, blanket, shield and toroidal field coils all were designed with very-low-activation materials and designs appear technically achievable. The result provides a fusion power reactor with a high degree of direct personnel access for maintenance and repair, with a large reduction in safety and environmental impact, and with much reduced waste-disposal problems. This low-activation design also appears economically attractive and is expected to have a high degree of public acceptance. DOE

N84-14015# California Univ., Livermore. Lawrence Livermore Lab.
TMX-U DIAGNOSTIC SYSTEM
Donald L. Correll 2 Sep. 1983 17 p refs Presented at the 3rd Conf. on Hot Plasma Diagn., Dubna, USSR, 12-16 Sep. 1983
(Contract W-7405-eng-48)
(DE83-017834; UCRL-89345; CONF-8309142-1) Avail: NTIS HC A02/MF A01

Using data from the TMX-U diagnostic system, the production of sloshing ions was verified and the formation of electron thermal barriers is presently being investigated on the Tandem Mirror Experiment-Upgrade (TMX-U). The TMX-U diagnostics are made up of the earlier TMX complement of diagnostics that determine confinement, microstability, and low-frequency stability, plus diagnostic instrumentation that measures electron parameters associated with mirror-confined electrons. The three subsystems within the TMX-U diagnostic system are described: (1) the

diagnostic facility (shot leader console, data cable system, and diagnostic timing system); (2) the individual diagnostic instruments that measure plasma and machine parameters; and (3) the data-acquisition and -analysis computer. DOE

N84-14016# Stanford Linear Accelerator Center, Calif.
NEW HEAVY-ION-FUSION ACCELERATOR RESEARCH PROGRAM
William B. Herrmannsfeldt May 1983 12 p refs Presented at the 7th Symp. on Sources and Ion Assisted Technol. and 4th Intern. Conf. on Ion and Plasma Assisted Tech., Kyoto, Japan, 12-16 Sep. 1983
(Contract DE-AC03-76SF-00515)
(DE83-014898; SLAC-PUB-3113; CONF-830920-8) Avail: NTIS HC A02/MF A01

The concepts of heavy ion fusion (HIF) are summarized, especially those aspects that are important to its potential for generating electrical power in the civilian sector. Highlights of the various HIF programs throughout the world are included. The US Department of Energy (DOE) plans a program, beginning in 1984, aimed at determining the feasibility of using heavy ion accelerators as drivers for inertial confinement fusion (ICF). The program concentrates on the aspects of accelerator design that are important to ICF. DOE

N84-14017# Oak Ridge National Lab., Tenn. Atomic, Molecular and High Voltage Physics Group.
ELECTRON-DRIFT VELOCITY AND IONIZATION AND ATTACHMENT COEFFICIENTS IN GASES/MIXTURES FOR DIFFUSE-DISCHARGE OPENING SWITCHES
J. G. Carter, S. R. Hunter, L. G. Christophorou, and V. K. Lakdawala 1983 8 p refs Presented at the 3rd Intern. Swarm Seminar, Innsbruck, 3 Aug. 1983
(Contract W-7405-eng-26)
(DE83-017206; CONF-8308112-1) Avail: NTIS HC A02/MF A01

The data presented show that it is possible to find gases and gas mixtures which have the desirable drift velocity, electron attachment, and breakdown strength characteristics required for diffuse-discharge opening switch applications. Several such gases and gas mixtures were identified and their approximate operating conditions were indicated. DOE

N84-14018# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
HYDROGEN PELLET INJECTION INTO ALCATOR C
M. Greenwald Sep. 1983 6 p refs Presented at the 11th European Conf. on Controlled Fusion and Plasma Phys., Aachen, Sep. 1983
(Contract DE-AC02-78ET-51013)
(DE83-016878; DOE/ET-51013/89; FFC/CP-83-10) Avail: NTIS HC A02/MF A01

A four shot pneumatic pellet injector, based on an ORNL design, was built and operated on the Alcator C Tokamak at MIT. The injector fires four independently timed frozen hydrogen pellets with velocities in the range 8 x 10(4) to 1 x 10(5) cm/sec. Each contains 6 x 10(19) particles which corresponds to < n sub e) > = 2 x 10(14)/cm(8). Pellet fueling and penetration, particle confinement, dependence of energy confinement on density profile and fueling mode, and edge physics and recycling as a function of fueling mode were studied. Typical pre-injection plasmas had anti n/sub e/ = 2 to 3 x 10(14), Bt = 80 to 100 kG, Ip = 400 to 500 kA, T/sub e/(0) = 1200 to 1500 ev. A single pellet injected into this plasma roughly doubles the electron density. Record plasma densities were obtained by multiple injections. Line average densities in excess of 8 x 10(14) were achieved, with highly peaked profiles. Central densities of 1.5 to 2 x 10(15) were measured. DOE

N84-14019# Science Applications, Inc., La Jolla, Calif. Applied Plasma Physics and Technology Div.
d-d TOKAMAK REACTOR ASSESSMENT
D. C. Baxter, A. E. Dabiri, D. Dobrott, J. E. Glancy, H. Gurol, W. K. Hagan, J. B. McBride, S. Tamor, and R. N. Cherdack (Burns and Roe, Inc.) May 1983 7 p refs Presented at the 5th Topical Meeting on the Technol. of Fusion Energy, Knoxville, Tenn., 26-28 Apr. 1983 Submitted for publication
(Contract DE-AC03-81ER-53113)
(DE83-016127; SAI-02383-454LJ/APPAT-4) Avail: NTIS HC A02/MF A01

A quantitative comparison of the physics and technology requirements, and the cost and safety performance of a d-d Tokamak relative to a d-t Tokamak was performed. The first wall/blanket and energy recovery cycle for the d-d Tokamak is simpler, and has a higher efficiency than the d-t Tokamak. In most other technology areas (such as magnets, RF, vacuum, etc.) d-d requirements are more severe and the systems are more complex, expansive and may involve higher technical risk than d-t Tokamak systems. Tritium technology for processing the plasma exhaust, and tritium refueling technology are required for d-d reactors, but no tritium containment around the blanket or heat transport system is needed. Cost studies show that for high plasma beta and high magnetic field the cost of electricity from d-d and d-t Tokamaks is comparable. Safety analysis shows less radioactivity in a d-d reactor but larger amounts of stored energy and thus higher potential for energy release. Consequences of all postulated d-d accidents are significantly smaller than those from d-t reactor tritium releases. DOE

N84-14020# Texas Univ., Austin. Inst. for Fusion Studies.
ENERGETIC-PARTICLE STABILIZATION OF BALLOONING MODES IN TOKAMAKS
M. N. Rosenbluth, S. T. Tsai (Chinese Academy of Sciences, Communist China), J. W. Van Dam, and M. G. Engguist Jul. 1983 13 p refs
(Contract DE-FG05-80ET-53088)
(DE83-016205; DOE/ET-53088/98) Avail: NTIS HC A02/MF A01

Introduction of an anisotropic, highly energetic trapped-particle species into a Tokamak may allow direct stable access to the high-beta regime of second stability. Under certain conditions, the mode at marginal stability acquires a real frequency close to the precessional drift frequency of the energetic particles, perhaps correlating with recent fishbone observations on PDX. DOE

N84-14021# Texas Univ., Austin. Inst. for Fusion Studies.
HAMILTONIAN FORMULATION OF REDUCED MAGNETOHYDRODYNAMICS
P. J. Morrison and R. D. Hazeltine Jul. 1983 53 p refs
(Contract DE-FG05-80ET-53088)
(DE83-016758; DOE/ET-53088/97) Avail: NTIS HC A04/MF A01

Reduced magnetohydrodynamics (RMHD) has become a principal tool for understanding nonlinear processes, including disruptions, in Tokamak plasmas. Although analytical studies of RMHD turbulence were useful, the model's impressive ability to simulate Tokamak fluid behavior was revealed primarily by numerical solution. A new analytical approach, not restricted to turbulent regimes, based on Hamiltonian field theory is described. The nonlinear (ideal) RMHD system, in both its high-beta and low-beta versions, is expressed in Hamiltonian form. Thus a Poisson bracket, [,], is constructed such that each RMHD field quantity, xi/sub i/, evolves according to xi/sub i/ = [xi/sub i/,H], where H is the total field energy. The new formulation makes RMHD accessible to the methodology of Hamiltonian mechanics; and had lead, in particular, to the recognition of new RMHD invariants and even exact, nonlinear RMHD solutions. A canonical version of the Poisson bracket, which requires the introduction of additional fields, leads to a nonlinear variational principle for time dependent RMHD. DOE

N84-14022# Texas Univ., Austin. Fusion Research Center.
VARIATIONAL THEORY OF RF-DRIVEN CURRENTS
D. A. Hitchcock and S. M. Mahajan Jul. 1983 21 p refs
(Contract DE-AC05-76ET-53036)
(DE83-016745; DOE/ET-53036/40) Avail: NTIS HC A02/MF A01

A variational theory for plasma currents driven by Radio Frequency waves is proposed. This theory agrees with earlier theories when the phase velocity of the waves is large but predicts enhanced currents at low phase velocities. The implications of these results are discussed. DOE

N84-14023# Los Alamos Scientific Lab., N. Mex.
STUDY ON DIFFUSION OF THE VERTICAL MAGNETIC FIELD IN THE TOROIDAL STABILIZING SHELL OF THE ZT-40M REVERSED-FIELD-PINCH DEVICE
Herbert F. Vogel and H. Preis Jul. 1983 31 p refs
(Contract W-7405-eng-36)
(DE83-016353; LA-9788-MS) Avail: NTIS HC A03/MF A01

FEDIFF is a finite element circuit-network code in which conductors are modeled in a three dimensional (3-D) lattice of metal plates, each plate possessing finite thickness. The plates are properly interconnected and magnetically coupled to all external and internal circuit elements. The lattice is transformed to become a circuit network and to be integrated. The result of computations is discussed, in which FEDIFF was adapted to solve 3-D vertical field diffusion problems in the toroidal stabilizing shell of the ZT-40M device at Los Alamos, when a vertical magnetic field is applied as a pulse. The stabilizing shell is made of aluminum, 2.2 cm thick, that is one skin depth at 110 Hz. Because the shell is constructed with a poloidal insulated gap, the vertical magnetic field diffuses into the shell, differently in the gap region than elsewhere. With the existing aspect ratio of major to minor radius being six, the field diffusion in a straight cylinder exhibits virtually the same characteristics as the toroidal configuration does, away from the gap, provided the cylinder possesses the same wall thickness and material makeup as the toroidal shell. DOE

N84-14024# Texas Univ., Austin. Inst. for Fusion Studies.
NONLINEAR KINETIC THEORY OF A SINGLE HELICITY TEARING INSTABILITY
K. Swartz and R. D. Hazeltine Aug. 1983 25 p refs
(Contract DE-FG05-80ET-53088)
(DE84-000049; DOE/ET-53088/103) Avail: NTIS HC A02/MF A01

The evolution of a single helicity tearing mode is analyzed by kinetic theory, including modification of the electron orbits by the islands themselves. Using flux coordinates appropriate to island geometry, analytic solutions for the time-dependent island width are obtained. These describe evolution from linear growth to nonlinear saturation in the collisionless limit, and transition from such saturation to slow Rutherford-type growth for increasing finite collisionality. Previous work is thus unified and generalized. DOE

N84-14025# Acton Research Corp., Mass.
INVESTIGATION OF SOFT X-RAY REFLECTIVE COATINGS Final Report, 1 Feb. - 30 Aug. 1983
Bruce K. Flint and Arno K. Hagenlocher 1983 76 p refs
(Contract DE-AC08-81DP-40156)
(DE84-000510; DOE/EP-40156/1) Avail: NTIS HC A05/MF A01

Current fusion experiments require efficient soft X-ray reflective coatings on the optics of diagnostic instrumentation, in order to record the images and spectra of X-ray emissions from laser fusion targets in the 30 eV to 1 keV energy range. The advent of the routine availability of selectively reflecting soft X ray coatings, on a series of mirrors optimized for wavelengths of interest, would make possible fast multi-channel target diagnostics. Sorting the orders of light dispersed by conventional grating and crystal monochromators would also be possible; in fact such coatings could be used alone as low resolution X-ray analyzers. DOE

N84-14026# Pacific Northwest Lab., Richland, Wash.
RADIATION HARDENING OF OXYGEN-DOPED NIOBIUM BY 14-MeV NEUTRONS
E. R. Bradley and R. H. Jones Sep. 1983 6 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19-22 Sep. 1983
(Contract DE-AC06-76RL-01830)
(DE84-000103; PNL-SA-11320; CONF-830942-13) Avail: NTIS HC A02/MF A01

The flow following irradiation at 300 K with T(d,n) neutrons to fluence levels ranging from 600 to 2 x 10 to the 22nd power m(+) are discussed. Hardening stages connected by a plateau region were observed in the niobium containing 185 wt ppM oxygen. Increasing the oxygen content by 300 wt ppM oxygen shifted the beginning of the high-fluence hardening stage from 6 x 10 to the 21st power to 1 x 10 to the 21st power m(+2), thereby eliminating the plateau region. This shift resulted in 1.5 times more hardening in the oxygen-doped niobium irradiated to fluence levels above 5 x 10 to the 21st power m(+2). DOE

N84-14027# Texas Univ., Austin. Inst. for Fusion Studies.
LINEAR RELATIVISTIC GYROKINETIC EQUATION IN GENERAL MAGNETICALLY CONFINED PLASMAS
S. T. Tsai (Chinese Academy of Sciences, Peking), J. W. VanDam, and L. Chen (Princeton Univ., N.J.) Aug. 1983 16 p refs
(Contracts DE-AC02-76CH-03073; DE-FG05-80ET-53088)
(DE84-000048; DOE/ET-53088/104) Avail: NTIS HC A02/MF A01

The gyrokinetic formalism for linear electromagnetic waves of arbitrary frequency in general magnetic-field configurations is extended to include full relativistic effects. The derivation employs the small adiabaticity parameter rho/LO where rho is the Larmor radius and LO the equilibrium scale length. The effects of the plasma and magnetic field inhomogeneities and finite Larmor-radii effects are also contained. DOE

N84-14028# California Univ., Livermore. Lawrence Livermore Lab.
INFANT-MORTALITY TESTING OF HIGH-ENERGY-DENSITY CAPACITORS USED ON NOVA
B. T. Merritt and K. Whitham 1983 5 p refs Presented at the IEEE 4th Intern. Pulsed Power Conf., Albuquerque, N. Mex., 6-8 Jun. 1983
(Contract W-7405-eng-48)
(DE83-018027; UCRL-88668; CONF-830621-44) Avail: NTIS HC A02/MF A01

Nova is a solid-state large laser for inertial-confinement fusion research. Its flashlamps are driven by a 60-MJ capacitor bank. Part of this bank is being built with high energy density capacitors, 52-(SIGMA)F, 22 kV, 12.5 kJ. A total of 2645 of these capacitors were purchased from two manufacturers. Each capacitor was infant-mortality tested. The first test consisted of a high-potential test, bushing-to-case, since these capacitors have dual bushings. Then the capacitors were discharged 500 times with circuit conditions approximating the capacitors normal flashlamp load. Failure of either of these tests or if the capacitor was leaking was cause for rejection. DOE

N84-14029# Sandia Labs., Albuquerque, N. Mex.
HYBRID ION DIODE THEORY AND COMPUTATIONS
J. P. Quintenz, C. W. Mendel, Jr., P. A. Miller, J. T. Crow, L. P. Mix, and S. E. Rosenthal 1983 5 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12 Sep. 1983
(Contract DE-AC04-76DP-00789)
(DE84-000102; SAND-83-0541C; CONF-830911-17) Avail: NTIS HC A02/MF A01

Intense ion beams for inertial confinement fusion research are produced by diodes in which electron current is inhibited by strong magnetic fields. The insulating magnetic field in these diodes is produced by the particle currents themselves or by an external field coil. The Hybrid ion diode incorporates a series field coil and a grooved epoxy filled anode to produce the pulsed ion beam. Both polar and equatorial versions of this diode concept were tested. The design of these diodes is discussed, including the description of various computer codes used in this process. The confirmation of various aspects of the theory for Hybrid diode operation will be discussed. A method for optimizing the diode focus is described. A ray trace code was written to investigate the focal properties of beams from these diodes and results are given. Some particle in cell computations for specific diode designs

also is presented and compared with experimentally measured quantities. DOE

N84-14030# Oak Ridge National Lab., Tenn.
BACKGROUND INFORMATION AND TECHNICAL BASIS FOR ASSESSMENT OF ENVIRONMENTAL IMPLICATIONS OF MAGNETIC FUSION ENERGY
J. B. Cannon Aug. 1983 404 p refs
(Contract W-7405-eng-26)
(DE83-018300; DOE/ER-0170) Avail: NTIS HC A18/MF A01

Background information for assessing the potential environmental implications of fusion-based central electric power stations is reported. An environmental review of the Magnetic Fusion Energy Program was developed. Transition of the program from demonstration of purely scientific feasibility (breakdown conditions) to exploration of engineering feasibility suggests that formal program environmental review under the National Environmental Policy Act is timely. An environmental impact statement on magnetic fusion will be based with this reference as a principle. DOE

N84-14031# Los Alamos Scientific Lab., N. Mex.
MATERIALS NEEDS FOR COMPACT FUSION REACTORS
Robert A. Krakowski 1983 15 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19-22 Sep. 1983
(Contract W-7405-eng-36)
(DE84-001366; LA-UR-83-2570; CONF-830942-39) Avail: NTIS HC A02/MF A01

The economic prospects for magnetic fusion energy is dramatically improved if for the same total power output the fusion neutron first-wall (FW) loading and the system power density is increased by factors of 3 to 5 and 10 to 30, respectively. A number of compact fusion reactor embodiments were proposed, all of which would operate with increased FW loadings, would use thin (0.5 to 0.6 m) blankets, and would confine quasi-steady-state plasma with resistive, water-cooled copper or aluminum coils. Increased system power density (5 to 15 MWt/m(3) versus 0.3 to 0.5 MW/m(3)), considerably reduced physical size of the fusion power core (FPC), and appreciably reduced economic leverage exerted by the FPC and associated physics result. The unique materials requirements anticipated for these compact reactors are outlined against the well documented backdrop provided by similar needs for the mainline approaches. Surprisingly, no single materials need that is unique to the compact systems is identified; crucial uncertainties for the compact approaches must also be addressed by the mainline approaches, particularly for in-vacuum components. DOE

N84-14032# KMS Fusion, Inc., Ann Arbor, Mich.
ABSOLUTELY UNSTABLE STIMULATED BRILLOUIN SCATTERING AND 2-PLASMON DECAY
Dick Berger and Linda Powers 1983 19 p Presented at ECLIM, Sep. 1983
(Contract DE-AC08-82DP-40152)
(DE84-000823; DOE/DP-40152/T2) Avail: NTIS HC A02/MF A01

The conditions for which stimulated Brillouin (SBS) and Raman (SRS) scattering and two-plasmon decay (TPD) are absolutely unstable were studied. Author

N84-14033# Sandia Labs., Albuquerque, N. Mex.
STEADY-STATE HYDROGEN TRANSPORT IN SOLIDS EXPOSED TO FUSION-REACTOR PLASMAS. PART 3: APPLICATIONS OF THEORY
B. L. Doyle and D. K. Brice 1983 14 p refs Presented at the 3rd Top. Meeting on Fusion Reactor Mater., Albuquerque, N.Mex., 19-23 Sep. 1983
(Contract DE-AC04-76DP-00789)
(DE84-001646; CONF-830942-51) Avail: NTIS HC A02/MF A01

The previously developed steady state theory of plasma driven H transport through wall membranes is applied to several materials of interest to controlled fusion. The theory is used to predict H isotope inventory, recycle time and permeation rate under nonisothermal conditions and includes the effects of H traps. The materials included in this study were 304 stainless steel, INCONEL, Al, Mo, Cu, W, Ni, Ti, V, Ta, Zr, Be, C, B, and Si. DOE

N84-14034# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
PLASMA/NEUTRAL GAS TRANSPORT IN DIVERTORS AND LIMITERS Ph.D. Thesis
Paul Joseph Gierszewski Sep. 1983 207 p refs
(Contract DE-AC02-78ET-51013)
(DE84-001594; DOE/ET-51013/99; PFC/RR-83-28) Avail: NTIS HC A10/MF A01

The engineering design of the divertor and first wall region of fusion reactors requires accurate knowledge of the energies and particle fluxes striking these surfaces. Simple calculations indicate that approx. 10 MW/m(2) heat fluxes and approx. 1 cm/yr erosion rates are possible, but there remain fundamental physics questions that bear directly on the engineering design. Hydrogen plasma and neutral gas transport in divertors and pumped limiters were studied in sufficient detail to answer some of the questions as to the actual conditions that will be expected in fusion reactors. This was accomplished in four parts: (1) a review of relevant atomic processes to establish the dominant interactions and their data base; (2) a steady state coupled 0-D model of the plasma core, scrape off layer and divertor exhaust to determine gross modes of operation and edge conditions; (3) a 1-D kinetic transport model to investigate the case of collisionless divertor exhaust, including non-Maxwellian ions and neutral atoms, highly collisional electrons, and a self consistent electric field; and (4) a 3-D Monte Carlo treatment of neutral transport to correctly account for geometric effects. DOE

N84-14035# Argonne National Lab., Ill. Chemical Technology Div.
COMPARISON OF MEASURED AND CALCULATED HELIUM PRODUCTION IN NICKEL USING NEWLY EVALUATED NEUTRON CROSS SECTIONS FOR (59)NI
L. R. Greenwood, D. W. Kneff, R. P. Skowronski, and F. M. Mann (Hanford Engineering Development Lab.) 1983 15 p refs Presented at the 3rd Top. Meeting on Fusion Reactor Mater., Albuquerque, N.Mex., 19 Sep. 1983 Prepared in cooperation with Rockwell Intern. Corp., Canoga Park, Calif.
(Contract W-31-109-eng-38)
(DE84-000565; CONF-830942-8) Avail: NTIS HC A02/MF A01

An evaluation of the (59) Ni cross sections was completed, permitting the calculation of all of the required reaction rate for any given neutron spectrum. Radiometric dosimetry and helium measurements were completed for several different mixed-spectrum reactors. Precise comparisons of the helium production cross sections and measurements can thus be made in well-characterized neutron spectra. Data are presented for several fusion materials irradiations. Procedures are recommended for calculating helium production for nickel-bearing materials in any neutron spectrum. DOE

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N84-14036 Maryland Univ., College Park.
THE QUANTUM HALL EFFECT Ph.D. Thesis
Robert James Joynt 1982 261 p
Avail: Univ. Microfilms Order No. DA8318905

A general investigation of the electronic structure of two dimensional systems is undertaken with a view towards understanding the quantum Hall effect. The work is limited to the case of a strong perpendicular magnetic field, with a disordered potential and an externally applied electric field. The electrons are treated as noninteracting. First, the scattering theory of the

system is worked out. The surprising result is found that a wavepacket will reform after scattering from an isolated potential. Also it will tend to be accelerated in the neighborhood of the scatterer if the potential has bound states. Fredholm theory can then be used to show that the extended states carry an additional current which compensates for the zero current of the bound states. Together, these give the quantized conductance.
Dissert. Abstr.

N84-14037# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
IS IT SUPERCONDUCTIVITY AT 293 K?
E. Mankiewicz-Cudny 10 Aug. 1983 7 p Transl. into ENGLISH from Horyzonty Techniki (Poland), v. 29, no. 4, 1976 p 2 and 21
(AD-A132545; FTD-ID(RS)T-1091-83) Avail: NTIS HC A02/MF A01 CSCL 20/3

The phenomenon of superconductivity is examined in an interview with Professor Kazimierz Antonowicz who explores evidence of superconductivity at room temperature in glazes and amorphous carbon. The shunting (switching) effect, the critical temperature for electron coupling (Cooper pairs), and the essence of the Josephson effect are discussed. The observed superconductive effect, just as the Josephson effect, was found to occur in the area of 10 angstroms in a sample of carbon between two layers of dusted aluminum. Whether this junction emits microwaves at low temperature is being investigated. A.R.H.

N84-14038# California Inst. of Tech., Pasadena.
X-RAY AND BACKSCATTERING ANALYSIS OF ION IMPLANTATION PHENOMENA IN GaAs AND RELATED COMPOUNDS
M. A. Nicolet and T. Vreeland, Jr. 4 Aug. 1983 23 p
(Contract MDA903-82-C-0348; ARPA Order 4550)
(AD-A132429) Avail: NTIS HC A02/MF A01 CSCL 20/12

It is well-known that amorphous GaAs layers produced by ion implantation behave differently upon thermal annealing from amorphized layers of Si or Ge. The special features of GaAs include non-linear regrowth with time, poor epitaxy at low temperatures, and the necessity of high annealing temperatures for electrical activation. Whilst many models have been proposed, the reasons for these differences are unclear. Double crystal X-ray diffractrometry, interpreted with a model of kinematic diffraction is a new tool which can give accurate information about strain and damage in imperfect crystalline films. It may therefore yield information about structural characteristics that may explain these differences. The present is for a study of implantation and annealing in GaAs and other materials by this technique, as well as by backscattering spectrometry (BSS). GRA

N84-14039# Office of Naval Research, London (England).
FOURTH EUROPHYSICAL CONFERENCE ON LATTICE DEFECTS IN IONIC CRYSTALS
Lawrence Slifkin 26 Jun. 1983 11 p Conf. held in Dublin, 30 Aug. - 3 Sep. 1982
(AD-A132387; ONRL-C-10-83) Avail: NTIS HC A02/MF A01 CSCL 20/2

This report discusses conference papers that dealt with ionic defects, such as vacancies, solute ions, and dislocations.
Author (GRA)

N84-14040# General Atomic Co., San Diego, Calif.
CHEMICAL VAPOR DEPOSITION OF ORIENTED TUNGSTEN FOILS FOR THERMIONIC CATHODES Final Report, 1 Oct. 1981 - 30 Nov. 1982
L. Yang Jun. 1983 21 p
(Contract N00014-81-C-2633)
(AD-A132379; GA-A-17175) Avail: NTIS HC A02/MF A01 CSCL 09/1

Efforts under the present contract were devoted to the preparation of CVD tungsten emitters containing a variety of preferred crystallographic orientations. The work is divided into two phases. In Phase I, a CVD tungsten deposition apparatus was built and CVD tungsten samples of various preferred crystallographic orientations were prepared and characterized with respect to microstructures and nature and degree of preferred orientations. These samples were delivered to NRL for the evaluation of their electron emission properties. In Phase 2, efforts were made to produce a high degree of preferred crystallographic orientations in thin CVD tungsten deposits (approx. 25 micron thickness) which are amenable to hole drilling by laser. Techniques for preparing CVD tungsten cathode structure were established and samples of oriented tungsten cathode structure were prepared for NRL evaluation. GRA

N84-14041# Northwestern Univ., Evanston, Ill. Dept. of Materials Science.
DETERMINING STRESSES IN THE PRESENCE OF NONLINEARITIES IN INTERPLANAR SPACING VERSUS SIN SQUARED PSI
I. C. Noyan and J. B. Cohen 29 Jul. 1983 23 p
(Contract N00014-80-C-0116; Grant NSF DMR-82-16972)
(AD-A132365; TR-10) Avail: NTIS HC A02/MF A01 CSCL 20/12

The physical meaning of non-linearities in d vs. sin sub 2 psi lines, encountered in X-ray measurements of surface residual stresses in polycrystalline materials is investigated. It is shown that when oscillations are present in any one reflection, switching to another reflection to obtain a straight line in d vs. sin sub 2 psi is feasible only under very special conditions. The authors also discuss the effect of quasi-homogeneous strain distributions and investigate the effects of psi-range on the accuracy of X-ray residual stress measurements when psi-splitting is present. A new geometric error is also discussed that can not be detected by the annealed powder method often used for alignment. GRA

N84-14042# Hawaii Univ., Manoa. Dept. of Electrical Engineering.
EFFECTS OF SIMULTANEOUS PHOSPHORUS AND ARSENIC DIFFUSIONS ON EMITTER PUSH AND DISLOCATION GENERATION M.S. Thesis
Paul M. Saka and James W. Holm-Kennedy Jul. 1983 162 p
(Contract N00014-76-C-1081)
(AD-A132331; AD-F630051) Avail: NTIS HC A08/MF A01 CSCL 20/12

High concentration phosphorus diffusions into single crystalline silicon damages the silicon material producing anomalous diffusion effects and degrading device performance. Dislocations and a supersaturation of point defects are created to reduce the lattice strain caused by the presence of the undersized phosphorus atoms. A consequence of the lattice damage is the emitter push effect observed in double diffused structures (i.e., bipolar junction transistors). Simultaneous phosphorus and arsenic diffusions from CVD dual dopant SiO2 sources are reported by M. Watanabe, et. al., to be dislocation free and eliminate emitter push in double diffused structures. This study investigated the effects of simultaneous phosphorus and arsenic drive-in diffusions from predeposition diffusions using dual dopant SiO2 spin-on emitter push and dislocation generation. Although no reduction in emitter push was observed in this study, a minimization in dislocation density was exhibited in the dual dopant diffused layer surfaces near the optimum ratios reported by M. Watanabe, et. al. It is recognized that both the present study and the M. Watanabe et. al., study are early investigations into this new technology. Both studies indicate that this new process shows promise to improve semiconductor device performance. Author (GRA)

N84-14043# Pennsylvania State Univ., University Park. Materials Research Lab.
TARGETED BASIC STUDIES OF FERROELECTRIC AND FERROELASTIC MATERIALS FOR PIEZOELECTRIC TRANSDUCER APPLICATIONS Final Report, 1 Dec. 1981 - 31 Dec. 1982
L. E. Cross, R. E. Newnham, G. R. Barsch, and J. V. Biggers Mar. 1983 322 p
(Contract N00014-78-C-0291)
(AD-A132262) Avail: NTIS HC A14/MF A01 CSCL 20/3

The report delineates the new progress made in the fifth and final year and discusses the major accomplishments of the full five year program both in the basic science and in the spin off to

practical transducer applications. Possible new areas of study which are suggested by the present studies are briefly reported. Major achievements include the development of a physical approach to understanding active composites, leading to the development of several new families of PZT:polymer piezoelectric composites for hydrophone application. New advances in the phenomenology and microscopic theory of electrostriction, and the evolution of a new family of high strain ferroelectric relaxor materials for practical application. New basic understanding of the polarization mechanisms in ferroelectric relaxors has been aided by the study of order-disorder of the cation arrangement in lead scandium tantalate, and the results correlate well with studies of relaxor behavior, and of shape memory effects in PLZT ceramics. Low temperature studies on pure and doped PZTs have given the first clear indication of the intrinsic (averaged) single domain response and correlate exceedingly well with earlier phenomenological theory. Crystal growth and ceramic processing studies have developed hand-in-hand with program needs providing new forms of conventional materials, new grain oriented structures and single crystals. GRA

N84-14044# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
PRINCIPLES OF SUPERIONIC CONDUCTION Annual Summary Report, 1982
Bernhardt J. Wuensch Jul. 1983 10 p
(Contract DE-AC03-76SF-00098)
(DE84-001215; LBL-16558) Avail: NTIS HC A02/MF A01

Alkali-ion conductors of relevance to battery systems and other solid-electrolyte applications were examined in an attempt to gain insight into the principle which govern fast-ion conduction. The program has two main tasks: performing exploratory syntheses, characterization. and conductivity measurements of possible new fast-ion conductors; and determination of crystal structures, using X-ray or neutron scattering, of materials of high conductivity and in which a marked variation of property with structure and chemistry is apparent. DOE

N84-14045# Oak Ridge National Lab., Tenn.
SOLID-STATE DIVISION Progress Report, period ending 31 Mar. 1983
M. K. Wilkinson, F. W. Young, Jr., B. R. Appleton, J. F. Cooke, L. H. Jenkins, R. M. Moon, P. H. Green, ed., and D. M. Watson, ed. Sep. 1983 300 p refs
(Contract W-7405-eng-26)
(DE84-000296; ORNL-5975) Avail: NTIS HC A13/MF A01

Progress and activities are reported on: theoretical solid-state physics (surfaces; electronic, vibrational, and magnetic properties; particle-solid interactions; laser annealing), surface and near-surface properties of solids (surface, plasma-material interactions, ion implantation and ion-beam mixing, pulsed-laser and thermal processing), defects in solids (radiation effects, fracture, impurities and defects, semiconductor physics and photovoltaic conversion), transport properties of solids (fast-ion conductors, superconductivity, mass and charge transport in materials), neutron scattering (small-angle scattering, lattice dynamics, magnetic properties, structure and instrumentation), and preparation and characterization of research materials (growth) and preparative methods, nuclear waste forms, special materials). DOE

N84-14046# Minnesota Univ., Minneapolis. School of Physics and Astronomy.
FAR INFRARED STUDIES ON SUPERCONDUCTORS AND HEAT-CAPACITY STUDIES ON LIQUID CRYSTALS Final Report
Cheng-Cher Huang 15 Sep. 1983 14 p refs
(Contract DE-AC02-79ER-10461)
(DE84-001105; DOE/ER-10461/T1) Avail: NTIS HC A02/MF A01

The status of three different projects is described. Low temperature heat capacity measurements on one transforming V3Si sample show that the electronic heat capacity in the superconducting state is well characterized by the weak coupling BCS theory. Preliminary characterization of one doped (3) He-cooled-Ge-bolometer for far infrared radiation gave resistance approx. = 3 x 10(6) (LAMBDA) and sensitivity approx. = 1 x 10(6) V/W at 0.43 K. One quasiadiabatic calorimeter with high resolution and versatility was built to study phase transitions between the mesophases in liquid crystals which have low thermal conductivity. A phase with hexatic type of ordering was first found in one liquid crystal mesophase, hexatic B. Results on one continuous SmA-SmC transition indicate the importance of retaining sixth order in the mean field Landau free energy expansion. DOE

N84-14047# California Univ., Livermore. Lawrence Livermore Lab.
SIMULATION OF SHOCK-INDUCED ENERGY FLUX IN MOLECULAR SOLIDS
Arnold M. Karo, Franklin E. Walker, Thomas M. DeBoni, and John R. Hardy (Nebraska Univ., Lincoln) 29 Sep. 1983 16 p refs Presented at the 9th Intern. Colloq. on Dyn. of Explosions and Reactive Systems, Poitier, France, 4-9 Jul. 1983
(Contracts W-7405-eng-48; E00014-82-F-0094)
(DE84-001157; UCRL-88760; CONF-830704-9) Avail: NTIS HC A02/MF A01

Computer molecular dynamics was used to study the time evolution of the energy of diatimic molecules embedded in a monatomic host lattice when the sytstem is shock loaded. Center-of-mass, rotatonal, and internal energies were each monitored. For H2 and CH groups in an iron host, the results demonstrate rapid and violent internal exictation of a totally athermal nature. The origins of this are discussed as are the reasons for the absence of a similar effect for a CH group in a carbon lattice. From these results for diatomic systems it is argued that large molecules, similarly treated, may easily be excited to the point of rupture. If they are so situated (e.g., at or near a surface) that during, or shortly after, excitation they escape from the lattice, they will rupture rather than de-excite and thus generate molecular fragments (e.g., free radicals) which could, in the case of explosive system, serve to initiate detonation. DOE

N84-14048# Los Alamos Scientific Lab., N. Mex.
STUDY OF DEFECTS PRODUCED IN TUNGSTEN BY 800-MeV PROTONS USING FIELD-ION MICROSCOPY
David J. Farnum, Walter F. Sommer, and Osman T. Inal 1983 7 p refs Presented at the 3rd Top. Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983 Prepared in cooperation with New Mexico Inst. of Mining and Technology, Socorro
(Contract W-7405-eng-36)
(DE84-001359; LA-UR-83-2572; CONF-830942-37) Avail: NTIS HC A02/MF A01

Defects produced in tungsten by 800 MeV proton bombardment were studied on the atomic scale with a field Ion Microscope. The material was subjected to a fluence, as measured by radiochemistry, of 10(22) pm(+2) (approx. 0.1 displacements per atom) at a temperature of 300K. A vacancy concentration of 10(+3) was observed. No vacancies were observed in the unirradiated samples. Since vacancies are essentially immobile (D sub v approx. 10(+57) cm(2)/sec) at the irradiation temperature used, it is believed that the observed concentrations are those of the radiation produced vacancies that did not spontaneously recombine. The observed interstitial concentration was lower than the vacancy concentration consistent with a higher diffusion rate for interstitials. Additionally, a depleted zone was observed consisting of approximately 300 vacancies. This void volume lies along a [121] pole and has an elongated shape. It is postulated that this damaged region was caused by a recoiling W atom after it underwent an internuclear cascade after collision with an incident proton. DOE

N84-14049# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.
FORCED TWO-PHASE COOLING OF THE TPC SUPERCONDUCTING SOLENOID
M. A. Green, F. Barrera, H. Petersen, C. E. Rago, R. I. Rinta, D. Talaska, J. D. Taylor, H. VanSlyke, and R. D. Watt Aug. 1983 11 p refs Presented at the Cryogenic Eng. Conf. and Intern. Cryogenic Mater. Conf., Colorado Springs, 15-19 Aug. 1983

(Contract DE-AC03-76SF-00098)
(DE83-017749; LBL-16470; CONF-830841-21) Avail: NTIS HC A02/MF A01

The cryogenic tests of the TPC 2-meter diameter superconducting solenoid on a 200 W refrigerator with gas-bearing turbines is described. The solenoid is cooled with two phase helium in forced flow around the superconducting winding. The two-phase helium was circulated using either the J-T circuit flow or a bellows type liquid helium pump. The particular problems associated with running a variable load on a gas-bearing turbine refrigerator are discussed. DOE

N84-14050# Brookhaven National Lab., Upton, N. Y.
COLLIDING-BEAM-ACCELERATOR LATTICE
J. Claus, M. Cornacchia, E. D. Courant, and G. Parzen 1983 7 p refs Presented at the 12th Intern. Conf. on High Energy Accelerators, Batavia, Ill., 11 Aug. 1983
(Contract DE-AC02-76CH-00016)
(DE83-017875; BNL-33609; CONF-830822-25) Avail: NTIS HC A02/MF A01

The lattice of the colliding beam accelerator, a 400 x 400 GeV pp facility proposed for construction at Brookhaven National Laboratory is described. The structure adopted is very versatile, in part in consequence of its desirable behavior as function of momentum deviation and as function of the betatron tunes. Each of the six insertions can be arranged to meet specific requirements at the crossing points as illustrated by a discussion of the tuneable low-beta insertions. The luminosity in these low-beta insertions (2 x 10 to the 33rd power/sq cm/sec would be an order of magnitude larger than the standard insertions. DOE

N84-14051# Los Alamos Scientific Lab., N. Mex.
REVISION OF THE STATISTICAL MECHANICS OF PHONONS TO INCLUDE PHONON LINE WIDTHS
W. C. Overton, Jr. 1983 4 p refs Presented at the 4th Intern. Conf. on Phonon Scattering in Condensed Matter, Stuttgart, 22 Aug. 1983
(Contract W-7405-eng-36)
(DE83-017229; LA-UR-83-2379; CONF-8308123-1) Avail: NTIS HC A02/MF A01

Zubarev in 1960 obtained the smeared Bose-Einstein (B-E) function in order to take into account the fact that the eigenenergy associated with a fixed phonon wave vector q and fixed polarization index j is not precisely defined but instead, is smeared by phonon-phonon and phonon-electron interactions. The ratio GAMMA (qj)/(NU) (qj) is often quite small, i.e., of the order of 0.01 or less, where GAMMA is the phonon linewidth and h-bar (NU) is the eigenenergy. However, in strongly anharmonic crystals GAMMA/(NU) may be as large as 0.3 at certain points of the Brillouin zone. In such dramatic cases one would suspect that such phonon linewidths would have some observable effect on the thermodynamic properties. The purpose of this work is to derive the expression for the average free energy per mode for a crystal having large phonon linewidths and to test the properties of the thermodynamic functions derivable from the average free energy per mode. DOE

N84-14052# Argonne National Lab., Ill. Materials Science and Technology Div.
HOST-LATTICE EFFECTS IN THE SPIN-ORBIT FINE STRUCTURE OF VACANCY-TRAPPED ELECTRONS
D. Y. Smith and A. H. Harker (Atomic Energy Research Establishment, Harwell, England) Sep. 1983 24 p refs Presented at the 2nd Intern. Conf. on Radiation Effects in Insulators, Albuquerque, N. Mex., 30 May 1983 Submitted for publication
(Contract W-31-109-eng-38)
(DE84-000599; CONF-830573-8) Avail: NTIS HC A02/MF A01

Defects in ionic solids involving an electron trapped by an anion vacancy exhibit several unique properties arising from spin-orbit effects in noncentral-force systems, including a complex dependence of the spin-orbit splitting on host-crystal properties. Two such trends evident in new data for F centers are: (1) an approximate inverse power-law dependence of the F-center spin-orbit splitting on the host-crystal lattice parameter and (2) a direct dependence of the splitting on the size of the host-lattice ions. The spin-orbit splitting is described by a semi-empirical formula. DOE

N84-14053# Argonne National Lab., Ill. .
MAGNETIC PROPERTIES OF Mo/Ni SUPERLATTICES
Ivan K. Schuller and M. Grimsditch 1983 12 p Presented at the MMM Conf., Pittsburgh, 8-11 Nov. 1983
(Contract W-31-109-eng-38)
(DE84-000568; CONF-831187-3) Avail: NTIS HC A02/MF A01

The dc magnetization of Mo/Ni nonlattice matched superlattices was measured in the temperature range 5 to 3000 K and in magnetic fields up to 10 kG. The saturation magnetization and the Curie temperature behavior are consistent with expectations based on thin film effects. However, there are indications of ferromagnetic coupling across the non-magnetic metal. Light scattering measurements were performed to study the magnon spectrum in superlattices. The Brillouin magnon spectra obtained from Mo/Ni superlattices show characteristic features associated with the collective behavior of the superlattice and are in good agreement with earlier theoretical predictions. DOE

N84-14054# Argonne National Lab., Ill.
NEUTRON-SCATTERING STUDIES OF MAGNETIC SUPERCONDUCTORS
S. K. Sinha, G. W. Crabtree, D. G. L. Hinks, H. A. Mook, and O. A. Pringle Nov. 1982 17 p refs Presented at the 6th Yamada Conf. on Neutron Scattering of Condensed Matter, Tokyo, 1 Sep. 1982 Prepared in cooperation with ORNL
(Contracts W-7405-eng-26; W-31-109-eng-38)
(DE84-000393; CONF-820935-11) Avail: NTIS HC A02/MF A01

Results obtained in the last few years by neutron diffraction on the nature of the magnetic ordering in magnetic superconductors are reviewed. Emphasis is given to studies of the complex intermediate phase in ferromagnetic superconductors where both superconductivity and ferromagnetism appear to coexist. DOE

N84-14055# Stanford Linear Accelerator Center, Calif.
SURFACE PROPERTIES OF METAL-NITRIDE AND METAL-CARBIDE FILMS DEPOSITED ON Nb FOR RF SUPERCONDUCTIVITY
E. L. Garwin, F. K. King, R. E. Kirby, and O. Aita (Univ. of Osaka Prefecture) Sep. 1983 29 p refs Presented at the 9th Intern. Vacuum Congr. and the 5th Intern. Conf. on Solid Surfaces, Madrid, 26 Sep. - 1 Oct. 1983
(Contract DE-AC03-76SF-00515)
(DE84-001491; SU-SLAC-PUB-3213; CONF-8309103-10) Avail: NTIS HC A03/MF A01

Various effects occur which prevent attainment of the high Q's and/or the high gradient fields necessary for the operation of RF superconducting cavities. One of these effects, multipactor, both causes the cavity to detune during filling due to resonant secondary electron emission at the cavity walls, and lowers the Q by dissipative processes. TiN deposited onto the high field regions of room temperature Al cavities was used at SLAC to successfully reduce multipactor in the past. TiN and its companion materials, NbN, NbC, and TiC, all on Nb substrates were studied under several realistic conditions: (1) as deposited, (2) exposed to air, and (3) 1 keV electron-bombarded. The studied films (up to 14 nm thickness) were sputter deposited onto sputter-cleaned Nb substrates. Results indicate that the materials tested gave substantially the same results. The results indicate that any of these films would be poor choices if simply deposited and exposed to air, but, in fact, the in-situ electron bombardment which occurs in cavities serves to reduce the effective secondary electron yield and thereby causes a substantial reduction in multipacting. DOE

N84-14056# Brookhaven National Lab., Upton, N. Y.
RADIATION DAMAGE IN SILICON DETECTORS
H. W. Kraner Aug. 1983 10 p refs Presented at the 2nd Pisa Meeting on Advanced Detectors, Castiglione della Pescaia, Italy,

3-7 Jun. 1983
(Contract DE-AC02-76CH-00016)
(DE84-001460; BNL-33692; CONF-8306110-3) Avail: NTIS HC A02/MF A01

The effects of radiation damage on silicon detectors which are being considered for high energy physics applications are reviewed. The main degradation in performance is an increase in leakage current, which is well characterized by an empirical damage constant for many radiations. A summary of data on damage constants is given. A brief discussion of annealing effects in terms of band gap level changes is included. DOE

N84-14057# Los Alamos Scientific Lab., N. Mex.
PREDICTION OF HIGH-PRESSURE PHASE TRANSITIONS IN SOLID N2 AND THE PRESSURE DEPENDENCE OF THE INTRAMOLECULAR VIBRATIONAL FREQUENCIES
R. D. Etters, V. Chandrasekhran, and K. Kobashi 1983 5 p refs Presented at the 9th AIRAPT Conf., Albany, N.Y., 24-29 Jul. 1983 Prepared in cooperation with Colorado State Univ., Ft. Collins
(Contract W-7405-eng-36)
(DE83-015260; LA-UR-83-2249; CONF-830763-7) Avail: NTIS HC A02/MF A01

A low temperature phase transition is predicted at P approx. = 19.2 kbar from a P42/mnm structure into R3c, produced by a rhombohedral distortion of the Pm3n structure. The volume change is 0.125 cm(3)/mole. This transition agrees with recent Raman scattering measurements. Another transition from R3c into R anti 3m is predicted at P approx. = 67.5 kbar, with a volume change of 0.1 cm(3)/mole. The pressure dependence of the internal mode frequencies for the R3c structure are in fair agreement with the two observed branches. DOE

N84-14058# Brookhaven National Lab., Upton, N. Y. Metallurgy and Materials Science Div.
EFFECT OF SILANE FRACTION ON THE OPTOELECTRONIC AND PHOTOVOLTAIC PROPERTIES OF RF-GLOW-DISCHARGE A-Si:H PREPARED FROM SiH4 + H2 MIXTURES
G. Rajeswaran, P. E. Vanier, F. J. Kampas, R. R. Corderman, and H. Wiesmann (H. T. Products, Inc.) 1983 5 p refs Presented at the 10th Intern. Conf. on Amorphous and Liquid Semiconductors, Tokyo, 22 Aug. 1983 Sponsored in part by Midwest Research Inst., Golden, Colo.
(Contract DE-AC02-76CH-00016)
(DE83-016730; BNL-33439; CONF-830895-8) Avail: NTIS HC A02/MF A01

The properties of films grown from SiH4H2 mixtures were systematically investigated. The hydrogen content, band gap, dark conductivity, and photoconductivity were measured as a function of SiH4 fraction. Solar cells were fabricated from 10 and 25% mixtures. DOE

N84-14059# Temple Univ., Philadelphia, Pa.
DYNAMIC ASPECTS OF THE DYE-SENSITIZED PHOTOCONDUCTIVITY OF SEMICONDUCTORS Technical Progress Report
Antonio M. P. Goncalves 1983 10 p refs
(Contract DE-AC02-81ER-10881)
(DE84-001132; DOE/ER-10881/T2) Avail: NTIS HC A02/MF A01

Three separate lines of investigation of dyes adsorbed on semiconductor and insulator surface were directed: first, direct fluorescence lifetime measurements aimed at exploring injection and the processes which compete with it; second, fluorescence quantum yield measurements as a function of surface coverage, designed to further examine the processes competing with injection, energy transfer quenching in particular; third, construction of a fast transient absorption spectrophotometer to probe the oxidized dye population, designed to examine the competition between recombination and escape. DOE

N84-13405*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SUPERCONDUCTING NIOBIUM THIN FILM SLOW-WAVE STRUCTURES
J. J. Bautista, S. M. Petty, L. H. Allen (Stanford Univ.), M. R. Beasley (Stanford Univ.), and R. H. Hammond (Stanford Univ.) *In its* The Telecommun. and Data Acquisition Rept. 15 Nov. 1983 p 39-51 refs (For primary document see N84-13401 04-32)
Avail: NTIS HC A08/MF A01 CSCL 20L

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N84-14060# Naval Postgraduate School, Monterey, Calif.
THE EFFECT OF CONDENSATE INUNDATION ON STEAM CONDENSATION HEAT TRANSFER TO WIRE-WRAPPED TUBING M.S. Thesis
Georgios Dimitriou Kanakis Jun. 1983 161 p
(AD-A132175; AD-E850405) Avail: NTIS HC A08/MF A01 CSCL 13/1

Steam condensation heat transfer measurements were made in a 5-tube test condenser having an additional perforated tube to simulate up to 30 active tubes. Results were obtained for smooth tubes and roped tubes wrapped with wire. A Sieder-Tate equation was used to correlate the inside heat-transfer coefficient. For smooth tubes, a leading coefficient of 0.029 was found, while it was 0.061 for the roped tubes. The average condensing coefficient measured for 30 smooth tubes was 0.59 times the Nusselt coefficient calculated for the first tube. When the smooth tubes were wrapped with wire, this ratio increased up to 0.86. Further, roped tubes without wire experienced a ratio of 0.63, while roped tubes wrapped with wire resulted in a ratio of 0.86. These preliminary data show that wire-wrapped tubes may lead to a significant reduction in condenser surface area. Author (GRA)

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N84-14061*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
RESEARCH AND TECHNOLOGY, 1983 Annual Report
1983 60 p
(NASA-TM-83540; NAS 1.15:83540) Avail: NTIS HC A04/MF A01 CSCL 05A

Highlights of the research accomplishments of the Lewis Research Center covering aeronautics, spaceflight, space technology, and materials and structures are presented. Author

N84-14062# Naval Postgraduate School, Monterey, Calif.
KNOWLEDGE BASE MANAGEMENT FOR MODEL MANAGEMENT SYSTEMS M.S. Thesis
George William Watson, Jr. Jun. 1983 111 p
(AD-A132211) Avail: NTIS HC A06/MF A01 CSCL 05/1

This study examines the issues involved in bringing qualitative and quantitative techniques to bear upon unstructured managerial

decisions. Furthermore, this work reviews the problems of user interface and data base interfaces as they relate to aspects of model base managements. The focus of this study is to identify some organizations of knowledge about models within the Decision Support System. In support of this goal, this report investigates what knowledge is, how it is structured, and how it is accessed.
Author (GRA)

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N84-14063 Pittsburgh Univ., Pa.
A COMPARATIVE STUDY OF THE FACTORS LINKING PSYCHOLOGY AND INFORMATION SCIENCE Ph.D. Thesis
Thomas Leo Minder 1982 128 p
Avail: Univ. Microfilms Order No. DA8317302

Psychology and information science are linked by two phenomena, man and information. The first sees man as its primary phenomenon in which information is sensed, transferred, and stored. The other begins with information as its primary phenomenon and sees man as one modifying media. The study plan is to: (1) identify the present state of the two disciplines through their historical developments; (2) identify a set of primitive conditions, terms, assumptions, boundary conditions, and underlying principles within which man and information can be studied; (3) identify the kinds of studies each discipline undertakes as it inquires into its problems or issues; and (4) determine the relationship that exists between information studies in three fields of common interest to psychology and information science. The selected fields are information processing, pattern recognition, and problem solving. Dissert. Abstr.

N84-14064# National Research Inst. for Oceanology, Stellenbosch (South Africa). Data Centre for Oceanography.
AN INTERDISCIPLINARY OCEANOGRAPHIC DATABASE
D. Hunter and C. Snyman May 1983 33 p refs
(CSIR-T/SEA-8207; ISBN-0-7988-2211-2) Avail: NTIS HC A03/MF A01

An interdisciplinary oceanographyic database using DMS-170, a hybrid relational/inverted database management system (DBMS) is discussed. This database allows countrywide access to the shared data was simple intractive or remote job entry terminals, providing a powerful scientific tool to the oceanographic community. Data retrieval can be achieved programmatically through COBOL or FORTRAN interfaces in batch operations, or interactively online using a high-level query language, enabling scientists to browse freely. The biological module features a taxonomic dictionary which greatly facilitates verification of animal names on data loading, reduces storage requirements and allows species to be researched on any of six levels of classification. A manual data dictionary was developed as a basis to the complete documention of the database. Author

N84-14065# Harvard Univ., Cambridge, Mass.
ON THE INTERACTIONS OF INCENTIVE AND INFORMATION STRUCTURES
Y. C. Ho and D. Teneketzis (Alphatech, Inc.) 1983 14 p refs Presented at the 22nd IEEE Conf. on Decision Control, San Antonio, 14 Dec. 1983
(Contract DE-AC01-80RA-50418)
(DE83-012084; CONF-831235-1) Avail: NTIS HC A02/MF A01

The subject of incentive control theory (i.e., control theory where the control is exerted indirectly) is still in its infancy. Similar to decentralized stochastic optimal control, it has intimate connection to the information structure of the problem. Incredible complexity exists even in the simplest problems. However, unlike the case of decentralized control where fundamental computational difficulties exist, incentive control offers the possibility of solving genuine problems with non-nested information structure. New conceptual, theoretical, and computational issues are awaiting further development. DOE

N84-14066# Argonne National Lab., Ill.
TOOLS FOR THE CREATION OF IMS DATABASE DESIGNS FROM ENTITY-RELATIONSHIP DIAGRAMS
G. Margrave, E. L. Lusk, and R. A. Overbeek 1983 16 p refs Presented at the 3rd Intern. Conf. on Entity-Relationship Approach, Anaheim, Calif., 5 Oct. 1983 Prepared in cooperation with Univ. of Northern Illinois, De Kalb
(Contract W-31-109-eng-38)
(DE84-000592; CONF-8310161-1) Avail: NTIS HC A02/MF A01

An overview of a system of software tools that can be used in preparing database designs is presented. The design technique is based on the Entity-Relationship model, the tools allow a designer to conveniently develop an Entity-Relationship model, from which an Extended Entity-Relationship model is produced. The extended Entity-Relationship model is used as input to tools that generate the basic design appropriate to the target database management system. DOE

N84-14067# California Univ., Livermore. Lawrence Livermore Lab. Technology Information System.
TIS: AN INTELLIGENT GATEWAY COMPUTER FOR INFORMATION AND MODELING NETWORKS. OVERVIEW
Viktor E. Hampel, Carolyn Bailey, Richard A. Kawain, Neil A. Lann, Stephen K. McGrogan, Walter S. Scott, Soren M. Stammers, and John L. Thomas Aug. 1983 10 p refs
(Contract W-7405-eng-48)
(DE83-017986; UCRL-53439) Avail: NTIS HC A02/MF A01

The Technology Information System (TIS) is being used to develop software for Intelligent Gateway Computers (IGC) suitable for the prototyping of advanced, integrated information networks. Dedicated to information management, TIS leads the user to available information resources, on TIS or elsewhere, by means of a master directory and automated access procedures. Other geographically distributed information centers accessible through TIS include federal and commercial systems like DOE/RECON, NASA/RECON, DOD/DROLS, DOT/TIC, CIS, and DIALOG in the United States, the chemical information systems DARC in France, and DECHEMA in West Germany. New centers are added as required. DOE

N84-14068# Oak Ridge National Lab., Tenn. Solid State Div.
STANDARD FORMAT FOR DATA FILMS
J. Z. Tischler 1983 7 p Presented at the 3rd Natl. Conf. on Synchrotron Radiation Instrumentation, Upton, N.Y., 12 Sep. 1983
(Contract W-7405-eng-26)
(DE84-000345; CONF-830910-1) Avail: NTIS HC A02/MF A01

A standard file format to be used at US synchrotron sources is proposed. This standard format encompasses all data structures likely to be needed, and will improve transferability of analysis programs. The proposed data format is a limited implementation of ISO/DP8211-Specification of a Data Descriptive File for Information Interchange. DOE

N84-14069# Pacific Northwest Lab., Richland, Wash.
MANAGEMENT AND DISPLAY OF DATA ANALYSIS ENVIRONMENTS FOR LARGE DATA SETS
Robert A. Burnett, Paula J. Cowley, and James J. Thomas Sep. 1983 11 p refs Presented at the 2nd Intern. Statistical Database Management Workshop, Los Altos, Calif., 27 Sep. 1983
(Contract DE-AC06-76RL-01830)
(DE84-001414; PNL-SA-11512; CONF-830950-2) Avail: NTIS HC A02/MF A01

Data management and display techniques for multiple data analysis is addressed: (1) the development of a model of the data analysis process incorporating the concepts of data analysis environments; (2) the design and use of data modification definitions (differential files) to represent multiple versions of a

large data base; (3) the use of data dictionaries/directories to manage, describe, and control multiple data analysis environments; and (4) the application of graphical display and interaction techniques to the examination and selection of data analysis environments. DOE

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N84-14070# Civil Aeronautics Board, Washington, D.C.
DEREGULATING THE AIRLINES: AN ECONOMIC ANALYSIS
Elizabeth E. Bailey, David R. Graham, and Daniel P. Kaplan May 1983 450 p refs
(PB83-250019) Avail: NTIS HC A19/MF A01 CSCL 05C

The history of government regulation of the airline industry is reviewed and the deregulation process is described. The economic performance of the deregulated industry is analyzed from an economic point of view. Deregulation brought substantial changes to the formerly regulated carrier's route networks and pricing policies. It also allowed new carriers, often with lower costs and different types of service, to provide scheduled interstate service. These changes are analyzed and the impact of deregulation on the convenience of air service, most notably to small communities is considered. Whether deregulated airline markets are operating competitively is examined. GRA

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

No abstracts in this category.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N84-14071*# Dayton Univ., Ohio. Dept. of Electrical Engineering.
STUDY AND REVIEW OF PERMANENT MAGNETS FOR ELECTRIC VEHICLE PROPULSION MOTORS Final Report
Karl J. Strnat Sep. 1983 183 p refs
(Contracts DEN3-189; DE-AI01-77CS-51044)
(NASA-CR-168178; DOE/NASA-0189/83-2; NAS 1.26:168178) Avail: NTIS HC A09/MF A01 CSCL 13F

A study of permanent magnets (PM) was performed in support of the DOE/NASA electric and hybrid vehicle program. PM requirements for electric propulsion motors are analyzed, design principles and relevant properties of magnets are discussed. Available PM types are reviewed. For the needed high-grade magnets, design data, commercial varieties and sources are tabulated, based on a survey of vendors. Economic factors such as raw material availability, production capability and cost are analyzed, especially for cobalt and the rare earths. Extruded Mn-Al-C magnets from Japan were experimentally characterized. Dynamic magnetic data for the range -50 deg to +150 deg C and some mechanical properties are reported. The state of development of the important PM material families is reviewed. Feasible improvements or new developments of magnets for electric vehicle motors are identified. Author

N84-14072# Army Mobility Equipment Research and Development Command, Fort Belvoir, Va.
BASELINE AND VERIFICATION TESTS OF THE ELECTRIC VEHICLE ASSOCIATES' CURRENT FARE STATION WAGON Final Test Report, 27 Mar. 1980 - 6 Nov. 1981
Edward J. Dowgiallo, Jr. and Robert D. Chapman Jan. 1983 113 p
(AD-A132549; MERADCOM-2375) Avail: NTIS HC A06/MF A01 CSCL 13/6

The EVA Current Fare Station Wagon, an electric vehicle, was tested at MERADCOM as part of a Department of Energy project to characterize the state-of-the-art of electric vehicles. The current Fare Wagon was manufactured in Cleveland, Ohio by Electric Vehicle Associates' Incorporated. It is powered by 22 6-V lead-acid batteries driving a 30-hp d.c. series motor through an SCR controller. The motor drives the rear wheels through a manually operated 4-speed transmission. Regenerative braking was provided. Author (GRA)

N84-14073# Argonne National Lab., Ill. Center for Transportation Research.
ENERGY-EFFICIENT AUTOMOBILES FOR THE FUTURE
Sarah J. LaBelle and Charles L. Hudson (Hudson Associates, Santa Barbara, Calif.) Aug. 1983 17 p refs Presented at Energy Resource Management '83, San Francisco, 22-26 Aug. 1983
(Contract W-31-109-eng-38)
(DE84-000600; CONF-830847-3) Avail: NTIS HC A02/MF A01

The characteristics of energy-efficient vehicles determined by the degree of incorporation of advanced technology and on reactions of consumers to the vehicles using those technologies are emphasized. Critical technology design aspects, as well as important consumer preferences, were identified. Nearly 300 vehicles were designed using a heuristic method to meet several different expectations of consumer preference for acceleration. Air-pollutant emission standards in the Clear Air Act Amendments of 1977 were assumed to be met in all designs, even when fuel efficiency was projected to increase sharply. Weight reductions are still expected to play an important role in improving fuel economy. Stirling, and electric motors were also expected to play significant roles in reducing automobile energy consumption. Use of alternative fuels for spark-ignition engines, as well as for the other engines, was projected. Large gains in overall energy efficiency were projected, with methanol fuels playing a significant role. Even with so many acceptable alternatives projected to be available to households for purchase, the spark-ignition engine always captured the largest share of the market. Steady improvement in that vehicle's design kept it attractive to households through the year 2000 under varying economic conditions. DOE

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N84-14074 Michigan Univ., Ann Arbor.
THE CRAB NEBULA: A THEORETICAL AND OBSERVATIONAL STUDY Ph.D. Thesis
Richard Conner Henry 1983 148 p

Avail: Univ. Microfilms Order No. DA8314290

The Crab Nebula is the remnant of a supernova event which occurred in 1054 AD. Because of its relatively young age, the filamentary gas contained in the Crab has not become substantially diluted by interstellar material. Thus, a detailed chemical abundance study should yield some information about the make up of the stellar precursor. An analysis of published optical spectrophotometric obeservations using detailed photoionization models plus the presentation of additional near infrared and near ultraviolet data is studied. The model analysis employed a previously existing photoionization code to calculate the emission line strengths as a function of various gas parameters. The near infrared observations were obtained with the CCD camera and the 4-M telescope at Kitt Peak National Observatory (KPNO) between wavelengths 6500 to 10200 in an attempt to measure the strengths of emission lines which the model calculations indicated were important. The near ultraviolet observations covered the spectral range wavelengths 3200 to 5000 and were made using the IDS and the 2.1-M telescope at KPNO. Dissert. Abstr.

N84-14075 Pittsburgh Univ., Pa.
A STUDY OF THE EMPIRICAL MASS-LUMINOSITY DIAGRAM FOR EARLY TYPE STARS Ph.D. Thesis
Eugene Robert Zizka 1982 130 p
Avail: Univ. Microfilms Order No. DA8318198

Efforts contributing to the establishment of a definitive empirical mass luminosity relationship for massive main sequence stars based on a critical search for stars of detached binary systems having well determined empirical masses and radii are discussed. A comprehensive survey of the effects of spectral absorption line pair blending on the accuracy of pertinent fundamental stellar parameters is presented. Procedures for reducing the effects of line pair blending in double line spectroscopic binaries yielding improved values of such stellar parameters are outlined. In the mass luminosity diagram, the agreement between the positions of unevolved binary stars and stellar models is found to be satisfactory. The positions of the primary and secondary stars of semidetached binary systems on the empirical mass luminosity diagram appear to be in qualitative agreemment with those predicted for massive binaries having undergone rapid mass transfer during core hydrogen burning. Dissert. Abstr.

N84-14076 Pennsylvania State Univ., University Park.
A VERY LARGE ARRAY 1411 MHz RADIO SURVEY: PROPERTIES OF COMPLETE SAMPLES OF RADIO AND OPTICALLY SELECTED QSO CANDIDATES IN A HIGH GALACTIC-LATITUDE FIELD Ph.D. Thesis
Kenneth James Mitchell 1983 253 p
Avail: Univ. Microfilms Order No. DA8312659

A sensitive radio survey covering approximately 25 square degrees was conducted. The radio survey model, instrumental parameters, data reduction, and radio source list are presented. The survey detected 520 radio sources above on-sky peak flux-density limits of generally 3 to 9 mJy with radio position accuracies of approximately 0.5 to 2.5 arcseconds. Radio-source number counts between 4-300 mJy are constructed. The angular-size distribution for the VLA radio sources with flux densities between 20-100 mJy is presented. A complete sample of 45 optically selected UVX QSO candidates with blue magnitudes $B < 18.5$ is isolated from the catalog produced previously by an optical survey of the same region. The VLA radio survey observations were used to detect radio emission from the objects belonging to the complete sample of UVX QSO candidates and the objects appearing in the optical catalogue in general. Radio detection limits for a sample of spectroscopically confirmed QSOs within the optical catalogue are also given. Dissert. Abstr.

N84-14077 California Inst. of Tech., Pasadena.
A STUDY OF A- AND B-TYPE STARS IN THE SOUTHERN GALACTIC HALO Ph.D. Thesis
Jeffrey Ross Pier 1983 151 p
Avail: Univ. Microfilms Order No. DA8310635

A sample of over 200 stars of spectral types A and B was selected for study. Drawn from the Preston and Shectman objective-prism survey of the southern galactic halo, the stars comprise a sample of halo objects selected without kinematic bias. Photoelectric UBV photometry was obtained and the sample stars have apparent V magnitudes mostly in the range $13.5 < or = V < or = 15.5$. The (U-B)--(B-V) two-color diagram shows that the halo AB stars have colors similar to those of globlar cluster blue horizontal-branch (BHB) stars. Reticon spectroscopy of the sample confirms the BHB status of the large majority of the sample. Interesting non-BHB stars found include a few high luminosity A stars, several stars of low metallicity and apparently normal main-sequence gravities which may be field Population II blue stragglers, and ten metallic-line stars. A few normal A stars have been found as far as 2 to 3 kpc from the plane, but none beyond that distance. Dissert. Abstr.

N84-14078 California Inst. of Tech., Pasadena.
SOUNDING ROCKET XUV OBSERVATIONS OF CAPELLA Ph.D. Thesis
Norman Bobroff 1983 145 p
Avail: Univ. Microfilms Order No. DA8310629

Capella (d = 13pc) was observed in the 170 A to 450 A band by a sounding rocket-borne spectrometer with a spectral resolution of 35 A FWHM. Minimum flux sensitivity varies with wavelength and a 2 upper limit is 0.25 and 0.6 photons 1/suare cm's at 180 A and 304 A respectively. The prominent stellar emission line in this bandpass is He II 304 A. The Capella flux at Earth in this line is expected to be in the range 2.8 to 5.4 photons 1/square cm's in the absence of intrastellar extinction. Interstellar absorption was computed from the Copernicus satellite measure of the neutral hydrogen column density. N(HI) = 1.2 x 10 to the 18th power/sqare cm, towards Capella and a ratio of N(HeI)/N (HI) = 0.1. The 50% attenuation at 304 A results in a flux at Earth of 1.4 to 2.7 1/square phcm's. Dissert. Abstr.

N84-14079 Columbia Univ., New York.
THE DEVELOPMENT OF AN IMAGING GAS SCINTILLATION PROPORTIONAL COUNTER FOR USE IN X-RAY ASTRONOMY Ph.D. Thesis
Charles James Hailey 1983 191 p
Avail: Univ. Microfilms Order No. DA8311840

An imaging gas scintillation proportional counter was constructed and optimized for use in X-ray astronomy. The imaging gas scintillation proportional counter combines submillimeter position resolution with energy resolution capabilities twice as good as those of conventional proportional counters. With a 21 square centimeter geometric area, the imaging gas schintillation proportional counter is useful between 0.1 kiloelectronvolts and 10 kiloelectronvolts. The development of the imaging gas scintillation proportional counter, the theory of its operation and its measured performance are discussed. The astrophysical questions which this powerful instrument is uniquely suited to address are also examined. Dissert. Abstr.

N84-14080 California Inst. of Tech., Pasadena.
ECLIPSE MAPPING OF ACCRETION DISKS IN CATACLYSMIC BINARIES Ph.D. Thesis
Keith Douglas Horne 1983 102 p
Avail: Univ. Microfilms Order No. DA8312055

Surface brightness distributions for accretion disks in eclipsing cataclysmic binaries may be reconstructed from observed eclipse light curves by use maximum entropy imaging methods. Three-color eclipse photometry of six eclipsing catalysmic binaries provides the basis for an observational study of the local and global structure of their accretion disks. Observations from several eclipse cycles are averaged to form mean eclipse profiles with diminished contamination by flickering. Flickering is shown to be widely distributed over the face of the accretion disks in RW Tri and LX Ser. Accretion disk maps are derived which give satisfying fits to the observed eclipse profiles and which are maximally symmetric about the center of the disk. Disk maps for nova DQ Her and for four nova-like systems show broad intensity distributions with bright spots, associated with the gas streams that feed the disks, in

evidence at a radii comparable to the disk tidal radius.
Dissert. Abstr.

N84-14081 City Univ. of New York, N. Y.
THE EFFECT OF OPACITY ON THEORETICAL MODELS OF RR LYRAE STARS Ph.D. Thesis
E. Olenka Hubickyj 1983 132 p
Avail: Univ. Microfilms Order No. DA8312353

The RR Lyrae instability strip is investigated with computer models that were calculated using Carson opacities. A nonlinear computer program was applied to fundamental and first overton modes of pulsation (ab- and c-type, respectively). Comparison of the models with observed surface light and velocity curves showed good agreement in phase of the secondary bump on the velocity curve and light amplitude for $M/M^* = 0.60 - 0.65 \log (L/L^*)$ approx 1.7 and $Y = 0.25$. A linear computer program was used to examine the location of the blue edges of the instability strip as mass and chemical composition varied. The results of the linear survey showed: (1) no substantial change in the PTLM relation due to opacity; (2) similar blue edges to those in previous studies that employed the Los Alamos opacity series are calculated with the Carson models for a lower helium abundance and with masses more consistent with evolutionary tracks. Several comparison tests of the models with observations showed good agreement. The overall linear results indicated a mass of 0.70 + or - 0.05 M^* and a helium content of 0.25 + or - 0.04. Dissert. Abstr.

N84-14082*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOFT X-RAY SPECTRAL OBSERVATIONS OF QUASARS AND HIGH X-RAY LUMINOSITY SEYFERT GALAXIES
R. Petre, R. F. Mushotzky, J. H. Krolik, and S. S. Holt Nov. 1983 53 p refs Submitted for publication
(NASA-TM-85118; NAS 1.15:85118) Avail: NTIS HC A04/MF A01 CSCL 03A

Results of the analysis of 28 Einstein SSS observations of 15 high X-ray luminosity ($L(x) > 10$ to the 435 power erg/s) quasars and Seyfert type 1 nuclei are presented. The 0.75-4.5 keV spectra are in general well fit by a simple model consisting of a power law plus absorption by cold gas. The averager spectral index $< \text{alpha} >$ is 0.66 + or - .36, consistent with $< \text{alpha} >$ for the spectrum of these objects above 2 keV. In all but one case, no evidence was found for intrinsic absorption, with an upper limit of 2 x 10 to the 21st power/sq cm. Neither was evidence found for partial covering of the active nucleus by dense, cold matter ($N(H) > 10$ to the 22nd power/sq cm; the average upper limit on the partial covering fraction is 0.5. There is no obvious correlation between spectral index and 0175-4.5 keV X-ray luminosity (which ranges from 3 x 10 to the 43rd to 47th powers erg/s or with other source properties. The lack of intrinsic X-ray absorption allows us to place constraints on the density and temperature of the broad-line emission region, and narrow line emission region, and the intergalactic medium. Author

N84-14083# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
TELESCOPE CALIBRATION FOR GAMMA SPECTROSCOPY WITH A NEW Ge(Li) DIODE CONFIGURATION [CALIBRACAO DE UM TELESCOPIO PARA ESPECTROSCOPIA GAMA COM UMA NOVA CONFIGURACAO DE DIODOS GE(LI)]
A. BuiVan, J. O. D. Jardim, J. Braga, M. V. A. Jardim, I. M. Martin, and G. Vedrenne Sep. 1983 22 p refs In PORTUGUESE; ENGLISH summary Submitted for publication
(INPE-2885-PRE/407) Avail: NTIS HC A02/MF A01

A telescope was developed to measure gamma-rays in the energy interval 10-1500 KeV, using two Ge(Li) diodes of 40 cu cm each, coaxially mounted in the same cryostat and an anticoincidence Nat(T2) shielding system. This new configuration allows a much better signal to noise ratio due to the lower diode operating in anticoincidence with the upper one and a high energy resolution. The results of the telescope calibrations with the calibrated sources Am-241, Na-22 and Eu-152 are described. From the analysis of the data obtained in the sum coincidence mode, a minimum detectable flux at 511 KeV is estimated to be < 0.002 photons /sq cm/s with a statistical significance of 3 sigma for 10 hours of observing time at 3 mb of residual atmosphere. That is about the minimum line flux emitted by the Galactic Center. The measurement of the flux at this line would confirm the time variability observed using data obtained through HEAO-3 satellite.
Author

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N84-14084 Michigan Univ., Ann Arbor.
STUDIES OF CATACLYSMIC VARIABLES Ph.D. Thesis
Glen Arthur Williams 1983 225 p
Avail: Univ. Microfilms Order No. DA8314384

A number of separate studies of cataclysmic variable stars are presented. Three color simultaneous photometry of the AM Herculis type binary 2A0311-227 is discussed. Light curves, and B-V and U-B color curves are shown. A Fourier analysis has failed to detect the 5 minute quasi-periodic oscillation found earlier in optical photometry and X-ray observations. It has detected oscillations at 13.7 and 20.2 minutes which are interpreted in terms of a nonsinusoidal light curve. The average orbital motion of the system in the color-color plane is shown. Radial velocity studies of the emission lines in five systems are considered. These are 2A0311-227, H2252-035, YY DRA, BT MON, and SW UMA. For 2A0311-227 numerical models of mass transfer from the secondary, along the magnetic field lines were performed to try and match the observed velocity curve. It is found that this model specifies the orientation of the dipole uniquely. The system BT mon was found to have different curve semiamplitudes and phases for H and He II. Dissert. Abstr.

N84-14085 Rice Univ., Houston, Tex.
SELF-CONSISTENT MAGNETOSPHERE FOR A STATIC ALIGNED ROTATOR Ph.D. Thesis
Juergen Walter Krause-Polstorff 1983 73 p
Avail: Univ. Microfilms Order No. DA8314947

It is argued that the Goldreich and Julian pulsar magnetosphere is not unique, that more plausible magnetosphere exist and that they are characterized by vacuum gaps separating the charge-separated plasmas in the pulsar magnetosphere. A number of such magnetospheres are modeled using discrete charges that are generated from the pulsar surface charge. The models are physically differentiated by their net charge, with one model having the net charge of the Goldreich and Julian model and the others less than this in regularly spaced intervals. It is demonstrated that static solutons exist which possess corotational regions above the polar regions and both a corotational and super-rotational region about the equator. The result is in accord with Philip's theorem concerning the impossibility of having only a corotational magnetosphere with vacuum gaps. The finite size of the space-charge configuration places the magnetosphere well within the light cylinder of all but one of the known radio pulsars (assuming that a pulsar has the standard radius). The confinement of the spacecharge with the light cylinder raises questions about the present assumptions made for pulsars. Dissert. Abstr.

N84-14086 Princeton Univ., N. J.
IONIZATION EQUILIBRIUM IN ISOLATED H 2 REGIONS Ph.D. Thesis
David Charles Eder 1983 67 p
Avail: Univ. Microfilms Order No. DA8311473

Theoretical ionization equilibrium models are combined with Copernicus ultraviolet observations to study a particular H II region component in the absorption spectra of gamma Sco and upsilon Sco. The gamma Sco observations imply that the region is characterized by $T = 104$ K,$n(h) = .2$ cm-(3), and an extent along the line of sight of approximately 16 parsecs. Ionization

equilibrium calculations incorporating recent theoretical values for photoionization cross sections and for rate coefficients of charge transfer are used to determine a separation of approximately 5 parsecs between the H II region and the ionizing star. Comparison with upsilon Sco observations suggest that small-scale clumps are present, with density varying by a factor of two or more over a scale of one parsec. Dissert. Abstr.

N84-14087 Washington Univ., Seattle.
AN ABUNDANCE ANALYSIS OF THE COOL BARIUM STARS Ph.D. Thesis
Verne V. Smith 1983 187 p
Avail: Univ. Microfilms Order No. DA8312176

A detailed abundance analysis was carried out for seven certain barium stars using high dispersion coude and infrared spectra. A fine analysis using published model atmosphere was used to determine iron peak elemental abundances, heavy element s-process and r-process abundances carbon, nitrogen and oxygen abundances and, for three stars, carbon-12 to carbon-13 ratios. The iron peak elements exhibit a rather narow range of abundances from approximately solar to one half solar. Heavy element abundances show the signature of s-processing with overabundances of these elements 5-10 times solar, while r-process abundances are roughly solar. Comparison between the observed s-process abundances and theoretical predictions from various neutron exposures show that this sample of barium stars is characterized by a narrow range of neutron exposures, with a lower limit of 60-80 neutrons captured per iron seed nucleus and approximately of the iron irradiated by neutrons. Dissert. Abstr.

N84-14088 State Univ. of New York, Stony Brook.
SELF-CONSISTENT SPHERICAL ACCRETION AND MODELS OF QUASARS Ph.D. Thesis
Amri Shraga Wandel 1983 114 p
Avail: Univ. Microfilms Order No. DA8313134

Some aspects of spherical accretion, which are particularly relevant in accretion onto a massive black hole, as a model for quasars and active galactic nuclei (AGN) investigated. Most results, though, are valid for spherical accretion in general, and are easily scaled with the mass and the accretion rate (which makes them applicable in different astrophysical problems). The influence of the radiation produced by the material falling onto the black hole on the accretion flow itself and investigate models that are self consistent in this sense were stressed. New nonadiabatic solutions for spherical accretion onto a black hole were presented. Our solutions, which have a high accretion rate (and hence radiational cooling dominates over compressive heating a large radii), are self consistent in the sense that the radiation emitted by the accretion flow controls the thermal profile of the gas.
Dissert. Abstr.

N84-14089 City Univ. of New York, N. Y.
LARGE SCALE GALACTIC SHOCKS AND MOTIONS OF THE CLOUD MEDIUM Ph.D. Thesis
Chao-Yea Wang 1983 147 p
Avail: Univ. Microfilms Order No. DA8312384

Quasi-steady flows of the interstellar gas in a spiral gravitational field are studied for the purpose of further understanding galactic shock, interstellar clouds, and star formation in the post shock regions. Qualitatively, the two phase model explored by Shu et al (1972) is followed closely. Moreover, the field of investigation was extended to the cloud phase in the post shock regions, especially where the star formation and cloud-cloud collisions are prominent. The problem also includes the velocity difference between the cloud and the intercloud phases behind the shock front. The drag force between the cloud and the intercloud phase is far from sufficient enough to bring them to co-move within a reasonable distance behind the shock front. The behavior of the cloud-cloud collision was studied and concluded that the cloud-cloud collision is the major mechanism that slows down the velocity of clouds in the post shock regions within approximately 100 pc behind the shock front. Dissert. Abstr.

N84-14090 Rochester Univ., N. Y.
TWO-DIMENSIONAL ACCRETION DISK STRUCTURE AND STABILITY Ph.D. Thesis
William Henry Cabot 1983 219 p
Avail: Univ. Microfilms Order No. DA8311487

The axisymmetric structure and stability of accretion disks pertinent to cataclysmic variables were investigated. A numerical, two dimensinal disk structure was calculated for a steady accretion rate of 10 to the 17th power gm/s and an assumed alpha rho turbulent shear viscosity with alpha = 0.4. Simple analytical forms of the equation of state and opacity law are used, for which convection does not arise. The vertical structure equations for a grid of annuli are integrated with radial coupling terms determined iteratively to give a consistent, two dimensional structure. The results are used to determine properties of viscous transport of angular momentum and heat, which, as shown in recent literature, cannot be estimated consistently with one dimensional models.
Dissert. Abstr.

N84-14091# Los Alamos Scientific Lab., N. Mex.
REVIEW OF ASTROPHYSICAL RESEARCH AT LOS ALAMOS
R. C. Kirkpatrick 1983 7 p Presented at the Southwest Regional Conf. on Astronomy and Astrophys., Fort Davis, Tex., 13-14 May 1983
(Contract W-7405-eng-36)
(DE83-017304; LA-UR-83-2329; CONF-8305133-1) Avail: NTIS HC A02/MF A01

The majority of astrophysical research at Los Alamos is done within three divisions: the theoretical division which, dates back to 1934, the applied theoretical physics division, and the environmental and and space sciences division, which combines satellite operations and geosciences. Tables list the scientists engaged in astrophysical studies with their areas of interest as well as those involved in calculating nuclear weapons effects in the atmosphere. A.R.H.

N84-14092# Los Alamos Scientific Lab., N. Mex.
NUCLEAR PHYSICS PROBLEMS FOR ACCRETING NEUTRON STARS
R. K. Wallace and S. E. Woosley (California Univ., Santa Cruz) 1983 7 p refs Presented at the Santa Cruz Summer Workshop on High Energy Transients, 11-22 Jul. 1983
(Contract W-7405-eng-36)
(DE83-017297; LA-UR-83-2486; CONF-830797-1) Avail: NTIS HC A02/MF A01

The importance of p(e(+)nu)n and of (p,(BETA)) reactions on (56) Ni during a thermonuclear runaway on a neutron star surface is pointed out. A fast 16 isotope approximate nuclear reaction network is developed that is suitable for use in hydrodynamic calculations of such events. DOE

N84-14093# Texas Univ., Austin. Center for Particle Theory.
DO PIONS CONDENSE IN NEUTRON-STAR MATTER?
J. W. Wheeler and A. M. Gleeson Apr. 1983 24 p refs
(Contract DE-AS05-76ER-03992)
(DE84-000463; DOE/ER-03992/516) Avail: NTIS HC A02/MF A01

Pion condensates in neutron-star matter, formed either as new modes, or on states identifiable with those of the free pion are studied. A description of neutron-star matter at finite temperature is formulated upon a suitable basis of realistic interactions in a modified background field description, and leads to the onset of a pion condensate between the density of nuclear matter and the density of free hadrons. This condensate, however, is blocked when strange hadrons are incorporated in the description. DOE

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design see *18 Spacecraft Design Testing, and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

N84-14094 Washington Univ., Seattle.
BAROCLINIC WAVES IN THE ATMOSPHERE OF MARS: OBSERVATIONS, LINEAR INSTABILITY, AND FINITE-AMPLITUDE EVOLUTION Ph.D. Thesis
Jeffrey Richard Barnes 1983 248 p
Avail: Univ. Microfilms Order No. DA8312121

An investigation is made of baroclinic instability and baroclinic waves in the atmosphere of Mars. Baroclinic instability is known to be fundamental importance for the Earth's atmosphere; it also occurs in the Earth's oceans, and has been extensively studied in the laboratory. The present work attempts to make use of the recent body of spacecraft observations, which provide strong evidence for the existence of baroclinic waves in the Martian atmosphere, to examine this process in yet another setting. Viking meterology data analyzed in order to define some of the important properties of the Martian waves. In particular, spectral and cross-spectral analysis is utilized to determine characteristic periodicities, wavelengths, phase speeds, and phase relationships of the midlatitude disturbances. These are found to be generally consistent with those expected for baroclinic waves in the Martian atmosphere. Substantial and interesting seasonal and inter-annual variability is present, particularly in association with the occurrence of a global dust storm during the first Viking year, and possible causes are discussed. Dissert. Abstr.

N84-14095 California Inst. of Tech., Pasadena.
RADIATIVE TRANSFER AND PHOTOCHEMISTRY IN THE UPPER ATMOSPHERE OF JUPITER Ph.D. Thesis
George Randall Gladstone 1983 163 p
Avail: Univ. Microfilms Order No. DA8310631

A direct finite difference numerical solution for the equation of radiative transfer is developed for use in planetary atmospheres. The procedure uses a plane-parallel atmosphere, and can treat partial frequency redistribution (for use in the radiative transfer of optically thick resonance lines), inhomogeneity, external or internal sources, and various boundary conditions. A program that utilizes this method is applied to the Lyman-alpha aurora, the reflected UB continuum from 1500 A to 1740 A, and the resonantly-reflected He I 584 A line of Jupiter. The obtained are used as constraints for a one dimensional photochemical-diffusive model of the hydrocarbon chemistry in Jupiter's upper atmosphere. It is shown that the amount of methane dissociation resulting from acetylene photochemistry is comparable to the amount that is due to direct photolysis. Profiles for the major observed hydrocarbon species are calculated and their sensitivity to eddy diffusion profile, chemistry, and solar UV flux is examined. The problems of auroral chemistry on Jupiter are considered. Dissert. Abstr.

N84-14096*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ORIGIN AND EVOLUTION OF THE SATURN SYSTEM
James B. Pollack and Guy Consolmagno (MIT, Cambridge) Nov. 1983 114 p refs Submitted for publication
(NASA-TM-85847; A-9485; NAS 1.15:85847) Avail: NTIS HC A06/MF A01 CSCL 03B

A review is provided of current concepts concerning the formation of the Saturn system and the subsequent history of the planet, its satellites, and rings. Emphasis is placed upon numerical models of Saturn's evolution and interior models of its satellites. Alternative theories are presented and assessed for the origins of the Saturn system, the rings of Saturn, and the atmosphere of Titan. Author

N84-14097# Los Alamos Scientific Lab., N. Mex.
MICROPROBE ANALYSES OF RARE-EARTH-ELEMENT FRACTIONATION IN METEORITIC MINERALS
T. M. Benjamin, C. J. Duffy, P. S. Z. Rogers, C. J. Maggiore, D. S. Woolum (California State Univ., Fullerton), D. S. Burnett (California Inst. of Tech., Pasadena), and M. T. Murrell (California Inst. of Tech., Pasadena) 1983 18 p refs Presented at the 3rd Intern. Conf. on Particle-Induced X-Ray Emission (PIXE) and its Anal. Appl., Heidelberg, 18-22 HyJul. 1983
(Contract W-7405-eng-36)
(DE83-017326; LA-UR-83-2368; CONF-830772-6) Avail: NTIS HC A02/MF A01

Two meteorites were analyzed by PIXE with the Los Alamos Nuclear chondrite St. Severin were chosen as likely candidates for use in Pub244 (t sub 1/2/ = 82 nıy) cosmochronology and geochronology. These applications require the meteoritic minerals to have unfractionated actinides and lanthanides relative to cosmic elemental abundance ratios. The PIXE analyses produced evidence of actinide-lanthanide fractionation in Pena Blanca Spring olhamite (CaS) whereas the St. Severin phosphates, whitlockit and chlorapatite, do not exhibit this fractionation. DOE

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N84-14098*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CHARACTERISTICS OF GAMMA-RAY LINE FLARES
Taeil Bai (Stanford Univ.) and Brian Dennis Oct. 1983 54 p refs
(Contract N00014-75-C-0673; Grants NAGw-92; NGL-05-020-272) (NASA-CR-174608; NAS 1.26:174608; SUIPR-961) Avail: NTIS HC A04/MF A01 CSCL 03B

Observations of solar gamma rays by the Solar Maximum Mission (SMM) demonstrate that energetic protons and ions are rapidly accelerated during the impulsive phase. To understand the acceleration mechanisms for these particles, the characteristics of the gamma ray line flares observed by SMM were studied. Some very intense hard X-ray flares without detectable gamma ray lines were also investigated. Gamma ray line flares are distinguished from other flares by: (1) inense hard X-ray and microwave emissions; (2) delay of high energy hard X-rays; (3) emission of type 2 and/or type 4 radio bursts; and (4) flat hard X-ray spectra (average power law index: 3.1). The majority of the gamma ray line flares shared all these characteristics, and the remainder shared at least three of them. Positive correlations were found between durations of spike bursts and spatial sizes of flare loops as well as between delay times and durations of spike bursts. Author

N84-14099# Texas Univ., Austin. Dept. of Physics.
LOOP COALESCENCE IN FLARES AND CORONAL X-RAY BRIGHTENING
T. Tajima, F. Brunel, and J. Sakai (High Altitude Observatory, Boulder, Colo.) May 1983 15 p refs
(Contract DE-FG05-80ET-53088)
(DE83-013070; DOE/ET-53088/94) Avail: NTIS HC A02/MF A01

Characteristics of solar flares such as their impulsive nature, time scale, heating, high energy particle spectrum, (BETA)-ray oscillations as well as recent X-ray photographs of coronal brightening are explained by the nonlinear coalescence instability of current loops. DOE

93 SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N84-14100 California Univ., Riverside.
MEDIUM ENERGY GAMMA RAYS FROM THE GALACTIC CENTER REGION Ph.D. Thesis
Eddie Michael Zanrosso 1983 175 p
Avail: Univ. Microfilms Order No. DA8314536

Gamma rays originating in the southern galactic hemisphere in the energy range of 1 to 10 MeV were observed from a balloon flight launched from Alice Springs, Australia (geomagnetic cutoff approximately 9 GV) on 19 April 1979. This is the first flight of a medium energy gamma ray telescope in the Southern Hemisphere. The observation was carried out using the University of Califor. ia Riverside's double Compton scatter gamma ray telescope. One transit of the galactic plane was observed at an average residual atmospheric depth of 3.9 gm/square cm with a total of 10 hours at float altitude. The data were analyzed in 17 energy bins from 1.0 to 9.0 MeV. A power law continuum of (0.010 + 04 0.002)E sub (-1.61 + or - 0.16) photons /-square cm. sec. MeV was observed. The continuum flux was measured to be .012 photons. 1/square cm. 1/sec from 1 to 9 MeV. Analysis using the instrumental thresholds and near-vertical cell combinations are also discussed. A technique that uses upward-moving gamma rays for background correction is discussed. Dissert. Abstr.

N84-14101 Michigan Univ., Ann Arbor.
EXTRAGALACTIC EMISSION-LINE OBJECTS AND THE MICHIGAN-TOLOLO SURVEY Ph.D. Thesis
David Wayne Lewis 1983 238 p
Avail: Univ. Microfilms Order No. DA8314319

An in-depth investigation into the contents, utility, and limitations of the Michigan-Tololo Survey was carried out to search for extragalactic emission-line objects. Particular attention was given to the analysis of Michigan discovery Lists I to IV; the properties of the 420 emission-line galaxy and quasar candidates were examined and compared with samples from other surveys. Emission lines were verified in more than 80% of the observed sample. Analysis of the numbers of galaxies by magnitude showed the Survey to be complete from magnitude 14 to 17. Galaxy classifications derived from the Schmidt plate spectra given in the published discovery lists were found to correlate strongly with observed parameters and with recognized natural groups of objects. The Survey technique appears efficient at finding class 1 and class 2 Seyfert galaxies, as well as a diverse collection of galaxies whose emission line strengths and colors are compatible with excitation by hot stars. Dissert. Abstr.

N84-14102 Harvard Univ., Cambridge, Mass.
SURVEYS OF GLOBULAR CLUSTER AND GALACTIC PLANE X-RAY SOURCES Ph.D. Thesis
Paul Louis Hertz 1983 262 p
Avail: Univ. Microfilms Order No. DA8311920

The capabilities of the Einstein X-ray Observatory, especially the arcsecond resolution of the High Resolution Imager and the sensitivity of the Imaging proportional Counter, were utilized to study galactic X-ray sources. Ten previously unidentified galactic bulge X-ray sources were observed with the HRI and located to Approximately 3 seconds (90% confidence radius). A diffuse infrared sources surrounding the burster GX354-0 (= MXB1728-34) was discovered in JHK photometry. It is identified as the most heavily obscured globular cluster yet found. X-ray observations of a single burst imply that the luminosity exceeded the Eddington limit > or approximately 8 times. The other nine bulge sources do not lie in obscured globular clusters. No infrared counterparts were detected for these nine sources and the limits derived are consistent with these sources being low mass X-ray binaries similar to Sco X-1. Author

N84-14103*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COSMIC RAY ANTIMATTER AND BARYON SYMMETRIC COSMOLOGY
F. W. Stecker, R. J. Protheroe, and D. Kazanas Jun. 1982 19 p refs
(NASA-TM-83958; NAS 1.15:83958) Avail: NTIS HC A02/MF A01 CSCL 03B

The relative merits and difficulties of the primary and secondary origin hypotheses for the observed cosmic-ray antiprotons, including the new low-energy measurement of Buffington, et al. We conclude that the cosmic-ray antiproton data may be evidence for antimatter galaxies and baryon symmetric cosmology. The present bar P data are consistent with a primary extragalactic component having /p=/equiv 1+/- 3.2/0.7x10 = to the -4 independent of energy. We propose that the primary extragalactic cosmic ray antiprotons are most likely from active galaxies and that expected disintegration of bar alpha/alpha < ban alpha/alpha. We further predict a value for ban alpha/alpha =/equiv 10 to the -5, within range of future cosmic ray detectors. Author

N84-14104# California Univ., Livermore. Lawrence Livermore Lab.
PHYSICS OF THE SYNCHROTRON MODEL OF COSMIC GAMMA-RAY BURSTS
E. P. Liang 27 Sep. 1983 10 p refs Presented at the Summer Workshop on High Energy Transients in Astrophys., Santa Cruz, Calif., 11-22 Jul. 1983 Submitted for publication
(DE84-000917; UCRL-89862; CONF-830797-3) Avail: NTIS HC A02/MF A01

The theoretical arguments leading to the thermal synchrotron model of cosmic gamma-ray bursts are reviewed. A magnetic flare-resonant absorption mechanism for the production of the hot electrons that can account for most of the unusual properties of the emission layer is proposed. DOE

N84-14105# Los Alamos Scientific Lab., N. Mex.
INVERSE COMPTONIZATION VS. THERMAL SYNCHROTRON
E. E. Fenimore, R. W. Klebesadel, and J. G. Laros 1983 7 p refs Presented at the Summer Workshop in Astronomy and Phys., Santa Cruz, Calif., 11 Jul. 1983
(Contract W-7405-eng-36)
(DE84-001039; LA-UR-83-2844; CONF-830797-4) Avail: NTIS HC A02/MF A01

There are currently two radiation mechanisms considered for gamma-ray bursts: thermal synchrotron and inverse comptonization. They are mutually exclusive since thermal synchrotron requires a magnetic field of approx. 10 to the 12th power Gauss whereas inverse comptonization cannot produce a monotonic spectrum if the field is larger than 10 to the 11th power and is too inefficient relative to thermal synchrotron unless the field is less than 10 to the 9th power Gauss. Neither mechanism can explain completely the observed characteristics of gamma-ray bursts. However, it is concluded that thermal synchrotron is more consistent with the observations if the sources are approx. 40 kpc away whereas inverse comptonization is more consistent if they are approx. 300 pc away. Unfortunately, the source distance is still not known and, thus, the radiation mechanism is still uncertain. DOE

N84-14106# California Univ., Livermore. Lawrence Livermore Lab.
THEORY OF OPTICAL FLASHES
Richard A. London 30 Sep. 1983 12 p refs Presented at a Workshop on High Energy Transients, Santa Cruz, Calif., 11 Jul. 1983
(Contract W-7405-eng-48)
(DE84-001450; UCRL-89892; CONF-830797-6) Avail: NTIS HC A02/MF A01

The theory of optical flashes created by X- and (BETA)-ray burst heating of stars in binaries is reviewed. Calculations of spectra due to steady-state X-ray reprocessing and estimates of the fundamental time scales for the nonsteady case are discussed.

The results are applied to the extant optical data from X-ray and (BETA)-ray bursters. Predictions of flashes from (BETA)-ray bursters detectable by a state of the art all-sky optical monitor are reviewed. DOE

99 GENERAL

N84-14107# Naval Ocean Systems Center, San Diego, Calif.
TECHNOLOGY ASSESSMENT: 1983 FORECAST OF FUTURE TEST TECHNOLOGY REQUIREMENTS Research Report, Oct. 1982 - May 1983
A. C. MacMurray and V. D. Leonard Jun. 1983 140 p
(AD-A132421; AD-F630038; NOSC/TD-598) Avail: NTIS HC A07/MF A01 CSCL 14/2

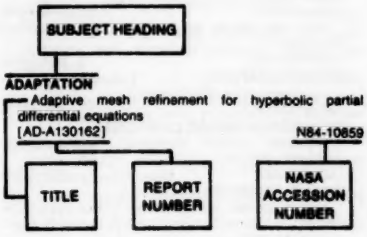
Within the Joint Logistics Commanders Automatic Test Equipment Program the Navy is assigned the task of monitoring emerging technologies. Monitoring emerging technologies includes assessing and evaluating potential impacts upon future test capabilities. This assessment of research, exploratory development and advanced development categories of research and development was accomplished within the Navy as a pilot project. The next phase will be a tri-service assessment. It is the intent of this document to provide industry and government an overview of potential influences that need to be considered in test technology research and development. Author (GRA)

N84-14108# Illinois Univ., Urbana. Coordinated Science Lab.
RESEARCH ACTIVITIES THAT OCCURRED IN THE COORDINATED SCIENCE LABORATORY FOR JULY 1, 1982 THROUGH JUNE 30, 1983 Annual Progress Report
H. V. Poor Aug. 1983 173 p
(Contracts N00014-79-C-0424; N00014-75-C-0612)
(AD-A132132; AD-E850405) Avail: NTIS HC A08/MF A01 CSCL 05/1

This report summarizes all sponsored research activities that occurred in the Coordinated Science Laboratory during the period July 1, 1982 to June 30, 1983. The summaries are categorized into 19 technical areas. A comprehensive list of faculty, graduate students, publications, and supporting agencies during this period of time is included. GRA

SUBJECT INDEX

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7051).

A

A STARS
A study of A- and B-type stars in the southern galactic halo N84-14077

ABILITIES
Cognitive components underlying the digit symbol test [PB83-250464] N84-13779

ABLATION
Vortex shedding and laser ablation [DE84-000301] N84-13565
Inertial effects in laser-drive ablation [DE84-000071] N84-13566

ABRASION
Wear during rubbing of a sintered metal powder body [AD-A132354] N84-13584

ABSORBERS (MATERIALS)
Evaluation of selective solar-absorber surfaces, phase 2 [DE84-000067] N84-13685

ABSORPTION
Laser-plasma interaction at 10.6 microns [DE84-001038] N84-13560

ABSORPTION SPECTRA
EXAFS study of Metglas 2605 CO [DE84-001203] N84-13299
Effects of compensation on light-induced metastable defects in aSi:H [DE83-016696] N84-13680
Computed survey spectra of 2-5 micron atmospheric absorption [AD-A132526] N84-13708
Ionization equilibrium in isolated H 2 regions N84-14086
Physics of the synchrotron model of cosmic gamma-ray bursts [DE84-000917] N84-14104

ABSORPTIVITY
Aethalometer: An instrument for the real-time measurement of optical absorption by aerosol particles [DE84-000400] N84-13538
Computed survey spectra of 2-5 micron atmospheric absorption [AD-A132526] N84-13708

ABUNDANCE
An abundance analysis of the cool barium stars N84-14087

ACCELERATION
Particle velocity measurements in laser irradiated foils using ORVIS [DE83-016629] N84-13563
Alternative shock characterizations for consistent shock-test specification [DE84-000482] N84-13619

ACCELERATION (PHYSICS)
Vortex shedding and laser ablation [DE84-000301] N84-13565
Technology evaluation of man-rated acceleration test equipment for vestibular research [NASA-CR-172160] N84-13781
Baseline and verification tests of the electric vehicle associates' current fare station wagon [AD-A132549] N84-14072

ACCELERATORS
Neutrino-oscillation experiments at Brookhaven National Laboratory [DE83-018275] N84-13476

ACCRETION DISKS
Two-dimensional accretion disk structure and stability N84-14090

ACCURACY
Construction and verification of a finite-element method for nonisothermal flows in porous media [DE83-017158] N84-13522
Coordinate-measuring machine capability [DE84-002014] N84-13544
External versus intuitive reasoning: The conjunction fallacy in probability judgment [AD-A131801] N84-13778
Selecting a subset of regression variables so as to maximize the prediction accuracy at a specified point [CSIR-TWISK-275] N84-13903
Determining stresses in the presence of nonlinearities in interplanar spacing versus Sin squared Psi [AD-A132365] N84-14041

ACHONDRITES
Microprobe analyses of rare-earth-element fractionation in meteoritic minerals [DE83-017326] N84-14097

ACID RAIN
Characterization of reactants, reaction mechanisms and reaction products leading to extreme acid rain and acid aerosol conditions in southern California [PB83-252825] N84-13697

ACIDS
Survey of water quality and flow in Maryland coastal zone streams: A data report [PB83-249375] N84-13660

ACOUSTIC ATTENUATION
Nonlinear acoustics in a dispersive continuum: Random waves, radiation pressure, and quantum noise N84-13920

ACOUSTIC MEASUREMENT
A comparison of frequency determination using real sodar data [DE83-017942] N84-13718

ACOUSTIC PROPAGATION
An introduction to the parabolic equation for acoustic propagation [AD-A132315] N84-13925

ACOUSTIC SCATTERING
A comparison of frequency determination using real sodar data [DE83-017942] N84-13718

ACOUSTIC SOUNDING
Sizing defects using annular-array techniques with an automated ultrasonic data-acquisition system [DE84-001644] N84-13597

ACOUSTICS
Research activities that occurred in the Coordinated Science Laboratory for July 1, 1982 through Jun 30, 1983 [AD-A132132] N84-14108

ACOUSTO-OPTICS
A compact optical pulse compressor with computer-generated holographic masks for radar applications [AD-A132152] N84-13430

ACTIVATION
Flame fronts with complex chemical networks [DE84-001175] N84-13255

ACTIVE CONTROL
Flight test and analyses of the B-1 structural mode control system at supersonic flight conditions [NASA-CR-170405] N84-13197

ADA (PROGRAMMING LANGUAGE)
Utilization of Ada as a program design language [AD-A132244] N84-13830

ADAPTIVE CONTROL
The design and implementation of debugging systems for languages with advanced control structures N84-13611

ADDITIVES
Improved polymers for enhanced-oil-recovery synthesis and rheology [DE83-017371] N84-13324
Determination of a jet fuel metal deactivator by high performance liquid chromatography [AD-A132220] N84-13336
Middle distillate fuel stability characteristics: A review [AD-A132156] N84-13337
Tensile strength of pressureless-sintered silicon nitride at elevated temperature [NAL-TR-753] N84-13611

ADHESIVE BONDING
Continuous plasma treatment and resin impregnation of a high-strength fiber material [DE84-000314] N84-13229

ADHESIVES
Surface contact wear and abrasive wear in lubricated sliding mechanisms N84-13573

ADSORPTION
Electrolytic gettering of tritius from air [DE84-000174] N84-13252
The organic geochemistry of deep ground waters and radionuclide-partitioning experiment: Under hydrothermal conditions [DE83-015784] N84-13651

ADVECTION
Calculation of natural convection within a heated enclosure using the method of second moments [DE84-001596] N84-13517
Development of a technique for short-term prediction of hydrometeors using advection and physical forcing [AD-A132259] N84-13740

AERIAL PHOTOGRAPHY
Aerial radiological survey of Area 11, Nevada Test Site [DE84-000440] N84-13650
The hardwood resource on nonindustrial private forest land in the southeast Piedmont [PB83-252759] N84-13663
Forest statistics for southwest-south Alabama counties, Forest Service resource bulletin [PB83-249763] N84-13664

AERODYNAMIC CHARACTERISTICS
Aerodynamic characteristics, including effect of body shape, of a Mach 6 aircraft concept [NASA-TP-2235] N84-13164
A preliminary study of solar powdered aircraft and associated power trains [NASA-CR-3699] N84-13194

AERODYNAMIC COEFFICIENTS
Triservice program for extending missile aerodynamic data base and prediction program using rational modeling [AD-A132455] N84-13166

AERODYNAMIC CONFIGURATIONS
Experimental aerodynamic characteristics of missiles with square cross sections
[AD-A132278] N84-13215

AERODYNAMIC DRAG
Tabulation of data from tests of an NPL 9510 airfoil in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TM-84579] N84-13151
Embedded cavity drag in steady and unsteady flows
[NASA-CR-172275] N84-13493

AERODYNAMIC FORCES
XTRAN2L: A program for solving the general-frequency unsteady transonic small disturbance equation
[NASA-TM-85723] N84-13150
An approximate method of estimating the aerodynamic interference between two parallel bodies (normal force and side force)
[NAL-TR-752] N84-13154
Aerodynamic force measurements with a train-gage balance in a cryogenic wind tunnel
[NASA-TP-2251] N84-13162
Triservice program for extending missile aerodynamic data base and prediction program using rational modeling
[AD-A132455] N84-13166
High altitude aerodynamic tests with simulated heat-shield outgassing
[AD-A132078] N84-13227

AERODYNAMIC HEATING
Enhancement of the CAVE computer code -- aerodynamic heating package for nose cones and scramjet engine sidewalls
[NASA-CR-3731] N84-13501

AERODYNAMIC INTERFERENCE
An approximate method of estimating the aerodynamic interference between two parallel bodies (normal force and side force)
[NAL-TR-752] N84-13154

AERODYNAMIC STALLING
Performance degradation of a typical twin engine commuter type aircraft in measured natural icing conditions
[NASA-TM-83564] N84-13173

AERODYNAMICS
Aeronautical Engineering, a continuing bibliography with indexes
[NASA-SP-7037(168)] N84-13136
Aeronautical Engineering: A continuing bibliography with indexes (supplement 167)
[NASA-SP-7037(167)] N84-13137
An overview of aerodynamic research and technology requirements as related to some military needs
[NASA-TM-85691] N84-13138
Some thoughts concerning large load-carrying vehicles
[NASA-TM-85701] N84-13139
Analytical model of rotor wake aerodynamics in ground effect
[NASA-CR-166533] N84-13157

AEROELASTICITY
La Recherche Aerospatiale, Biomonthly Bulletin, no. 1982-4, 209/July-August 1982
[ESA-TT-781] N84-13141
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-5, 210/September-October 1982
[ESA-TT-785] N84-13142
Specification for a Program for an Interative Aeroelastic Solution (PIAS)
[NASA-CR-172200] N84-13153
On the effect of gyroscopic forces on the instability of certain fluid-elastic systems. Part 1: Definitions
[PUBL-340] N84-13499

AEROEMBOLISM
Decompression procedures for flying after diving, and diving at altitudes above sea level
[AD-A132039] N84-13771

AERONAUTICAL ENGINEERING
Aeronautical Engineering, a continuing bibliography with indexes
[NASA-SP-7037(168)] N84-13136
Aeronautical Engineering: A continuing bibliography with indexes (supplement 167)
[NASA-SP-7037(167)] N84-13137
Research and technology, 1983
[NASA-TM-83540] N84-14061

AEROSOLS
Aethalometer: An instrument for the real-time measurement of optical absorption by aerosol particles
[DE84-000400] N84-13538
Characterization of reactants, reaction mechanisms and reaction products leading to extreme acid rain and acid aeroeol conditions in southern California
[PB83-252825] N84-13697
Aerosol size distribution using the extinction-sedimentation inversion technique
[AD-A132158] N84-13711
Optical properties of the marine aerosol as predicted by a BASIC version of the Navy aerosol model
[AD-A132411] N84-13986
Calculation of atmospheric transmittance by IBM 3033 computer code LOWTRAN IIIB
[AD-A132123] N84-13989

AEROSPACE ENGINEERING
An overview of aerodynamic research and technology requirements as related to some military needs
[NASA-TM-85691] N84-13138
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(09)] N84-13204

AEROSPACE MEDICINE
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 251)
[NASA-SP-7011(251)] N34-13767

AEROSPACE TECHNOLOGY TRANSFER
Potential means of support for materials processing in space. A history of government support for new technology
[NASA-TM-82554] N84-13205

AFFINITY
Positive ion-molecule reactions in OCS/hydrocarbon mixtures
[AD-A132350] N84-13237

AGGREGATES
The effect of surface charge on the rheology of concentrated aqueous quartz suspensions
[CSIR-CENG-423] N84-13235
Geology of carbonate aggregate resources of Illinois, Illinois mineral notes
[PB83-251140] N84-13725

AGING (MATERIALS)
Aging of polymeric materials
[AD-A132250] N84-13318

AGRICULTURE
County-level wind resource estimates for DOE Region 5
[DE84-000009] N84-13744

AILERONS
Flight service evaluation of advanced composite ailerons on the L-1011 transport aircraft
[NASA-CR-172246] N84-13223

AIR
Electrolytic gettering of tritius from air
[DE84-000174] N84-13252
Air-breakdown limits for microwave-pulse propagation. Part 1. Experiments
[DE83-017832] N84-13438

AIR BREATHING ENGINES
A study of air breathing rockets. 3: Supersonic mode combustors
[NAL-TR-756] N84-13213

AIR CONDITIONING EQUIPMENT
A rotary vane open reversed Brayton cycle air conditioning and refrigeration system N84-13574

AIR FLOW
An experimental investigation into the forebody and engine inlet airflow characteristics of a photographic reconnaissance window pallet on the RF/A-18 aircraft
[AD-A132271] N84-13167
Recent Japanese progress in fire modeling N84-13353
On smoke control experiments N84-13379
Experimental study of three-dimensional natural convection at high Rayleigh number
[DE83-011982] N84-13530
Study of the contained air flow in a radial tire: Experimental
[DE84-000840] N84-13591

AIR MASSES
Air mass computer program for atmospheric transmittance/radiance calculation: FSCATM
[AD-A132108] N84-13712

AIR NAVIGATION
Aircraft navigation technology and errors
[GPO-26-859] N84-13170

AIR POLLUTION
Oxygen-18 measurements in the assessment of natural and anthropogenic sulfur in the environment
[DE84-000566] N84-13690
The effects of relaxing automobile emission standards: A géneric analysis and an urban case study
[DE84-000193] N84-13693
SRL tethersonde and echosonde data, Anderson Creek Valley, California
[DE84-001680] N84-13715

AIR QUALITY
The effects of relaxing automobile emission standards: A generic analysis and an urban case study
[DE84-000193] N84-13693

AIR TO AIR MISSILES
Bank-to-turn control
[AD-A132491] N84-13214

AIR TRAFFIC CONTROL
Traffic alert and collision avoidance system (TCAS): A functional overview of active TCAS I
[AD-A132281] N84-13171

AIR TRANSPORTATION
Census of US civil aircraft
[PB83-252460] N84-13147

AIR WATER INTERACTIONS
Data validation and summary for the NRL remote sensing experiment: Phelps Bank, July, 1982. Part 2: Meteorology
[AD-A132105] N84-13646
Fate and effects of metals in the sea-surface microlayer
[DE84-000114] N84-13752

AIRBORNE EQUIPMENT
An airborne color video insetter
[AD-A132183] N84-13185

AIRBORNE/SPACEBORNE COMPUTERS
Helicopter In-flight Monitoring System second generation (HIMS 2)
[AD-A132498] N84-13179

AIRCRAFT ACCIDENTS
Aircraft accident report - United Airlines Flight 2885, N8053U, McDonnell Douglas DC-8-54F, Detroit, Michigan, January 11, 1983
[PB83-910407] N84-13168
Aircraft accident report - A. E. Staley Manufacturing Company, Inc., Canadair Challenger CL-600, N805C, Hailey, Idaho, January 3, 1983
[PB83-910405] N84-13169
Crash Position Indicator/Crash Survivable Flight Data Recorder ejectable versus nonejectable
[AD-A132329] N84-13184

AIRCRAFT CONTROL
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-2, 207/March-April 1982
[ESA-TT-759] N84-13143
An application of nonlinear programming to the design of regulators of a linear-quadratic formulation
[NASA-CR-17253] N84-13380

AIRCRAFT DESIGN
Some thoughts concerning large load-carrying vehicles
[NASA-TM-85701] N84-13139
A preliminary study of solar powdered aircraft and associated power trains
[NASA-CR-3699] N84-13194
Statistical analysis of turbulence data from the NASA Marshall Space Flight Center atmospheric boundary layer tower array facility --- statistical correlations for aircraft design
[NASA-CR-3737] N84-13730

AIRCRAFT ENGINES
Power effects on the longitudinal characteristics on single-engine propeller-driven aircraft
[ARL-AERO-REPT-157] N84-13174
Three-dimensional viscous design methodology for advanced technology aircraft supersonic inlet systems
[NASA-TM-83558] N84-13190
Engine performance monitoring: Rolls-Royce Dart and Allison T56 turbo-prop engines
[ARL-MECH-ENG-NOTE-393] N84-13191
Work done to determine the source of errors on conditioned pressure transduce signals in the JT9D-7F turbofan engines used on SAA Boeing 747 aircraft
[NIAST-82/78] N84-13192

AIRCRAFT FUELS
Investigation of sources, properties and preparation of distillate test fuels
[NASA-CR-168227] N84-13332
Handbook of aviation fuel properties
[AD-A132106] N84-13338

AIRCRAFT INDUSTRY
A microcomputer program package of the USAF stability and control DATCOM
[AD-A132143] N84-13199

AIRCRAFT INSTRUMENTS
Helicopter In-flight Monitoring System second generation (HIMS 2)
[AD-A132498] N84-13179
Simulator study of pilot-aircraft-display system response obtained with a three-dimensional-box pictorial display
[NASA-TP-2122] N84-13182

AIRCRAFT LANDING
Flight-test of the glide-slope track and flare-control laws for an automatic landing system for a powered-lift STOL airplane
[NASA-TP-2128] N84-13198

AIRCRAFT NOISE
Continued research on selected parameters to minimize community annoyance from airport noise
[NASA-CR-174607] N84-13688

AIRCRAFT PARTS
Alternative shock characterizations for consistent shock-test specification
[DE84-000482] N84-13619
AIRCRAFT PERFORMANCE
Performance degradation of a typical twin engine commuter type aircraft in measured natural icing conditions
[NASA-TM-83564] N84-13173
AIRCRAFT SAFETY
Aircraft navigation technology and errors
[GPO-26-859] N84-13170
Performance degradation of a typical twin engine commuter type aircraft in measured natural icing conditions
[NASA-TM-83564] N84-13173
Statistical analysis of turbulence data from the NASA Marshall Space Flight Center atmospheric boundary layer tower array facility --- statistical correlations for aircraft design
[NASA-CR-3737] N84-13730
AIRCRAFT STRUCTURES
Some thoughts concerning large load-carrying vehicles
[NASA-TM-85701] N84-13139
Numerical simulation of two-dimensional heat transfer in composite bodies with application to de-icing of aircraft components
[NASA-CR-168283] N84-13490
AIRFOILS
La Recherche Aerospatiale, Biomonthly Bulletin, no. 1982-4, 209/July-August 1982
[ESA-TT-781] N84-13141
A viscous-inviscid interactive procedure for rotational flow in cascades of two dimensional airfoils of arbitrary shape
[NASA-CR-174609] N84-13149
Tabulation of data from tests of an NPL 9510 airfoil in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TM-84579] N84-13151
A fully vectorized numerical solution of the incompressible Navier-Stokes equations
[NASA-CR-174496] N84-13491
AIRLINE OPERATIONS
Deregulating the airlines: An economic analysis
[PB83-250019] N84-14070
AIRPORTS
Continued research on selected parameters to minimize community annoyance from airport noise
[NASA-CR-174607] N84-13688
ALABAMA
Forest statistics for southwest-north Alabama counties
[PB83-251314] N84-13662
Forest statistics for southwest-south Alabama counties, Forest Service resource bulletin
[PB83-249763] N84-13664
Forest statistics for southeast Alabama counties, Forest Service resource bulletin
[PB83-250753] N84-13666
Forest statistics for west central Alabama counties, Forest Service resource bulletin
[PB83-249961] N84-13668
ALERTNESS
The programming and validation of the computerised version of the intermediate mental alertness test
[CSIR-PERS-303] N84-13776
ALGAE
Yields photosynthetic efficiencies, and proximate chemical composition of dense cultures of marine microalgae, a subcontract report
[DE83-011992] N84-13757
ALGEBRA
The specific solutions of a uniform algebraic differential equation of the second order N84-13790
Convolution of generalized vector measures N84-13803
Concurrency control for resilient nested transactions
[AD-A132501] N84-13891
Splice and Malcev algebras N84-13911
ALGORITHMS
The computer fire codes and required new data N84-13369
Algorithms for single-signal and multisignal minimum-cross-entropy spectrum analysis
[AD-A132400] N84-13420
Outline of methods for design of superconducting turbogenerators
[AD-A132528] N84-13451
Computer-aided synthesis and design of monolithic microwave GaAs MESFET amplifiers
[AD-A132474] N84-13452
Computations of turbulent recirculating flows with fully coupled solution of momentum and continuity equations
[DE84-001529] N84-13518
Fully-coupled solution of pressure-linked fluid flow equations
[DE83-017989] N84-13527
Modelling of submerged cable dynamics
[AD-A132495] N84-13580
Solution of groundwater-flow equations using an orthogonal finite-element scheme
[DE84-000690] N84-13648
Scheduling supercomputers
[AD-A132512] N84-13822
The design of backtrack algorithms
[AD-A132290] N84-13828
Algorithms for automated diagnosis of faults in physical plant
[DE84-000192] N84-13841
Computer implementation, accuracy, and timing of radiation view-factor algorithms
[DE83-017618] N84-13849
Acceleration of convergence of vector sequences
[NASA-TP-2193] N84-13885
Concurrency control for resilient nested transactions
[AD-A132501] N84-13891
Curve fit technique for a smooth curve using Gaussian sections
[AD-A132499] N84-13893
Analysis-plot generation code with significance levels computed using Kolmogorov-Smirnov statistics valid for both large and small samples
[DE84-001581] N84-13907
An introduction to the parabolic equation for acoustic propagation
[AD-A132315] N84-13925
Ultrasonic 3-D reconstruction of inclusions in solids using the inverse Born algorithm
[DE83-018082] N84-13928
ALKALI METALS
Introduction: Advances and opportunities in cluster research
[DE84-000364] N84-13917
ALPHA PARTICLES
Code BETAL to calculation Alpha/Beta activities in environmental samples
[JEN-549] . N84-13816
ALPHANUMERIC CHARACTERS
The effects of character stroke width on the visibility of a head-coupled display
[AD-A132046] N84-13183
Size of letters required for visibility as a function of viewing distance and observer visual acuity
[PB83-250589] N84-13782
User's guide to Sandia TEX
[DE83-016763] N84-13840
ALUMINUM
Reduction of tritium permeation through iron using aluminum-ion implantation
[DE84-000184] N84-13279
Aluminum as a global high-pressure equation-of-state standard
[DE84-000153] N84-13287
A rectangular gate merged MOSBJT
[AD-A132450] N84-13453
Particle velocity measurements in laser irradiated foils using ORVIS
[DE83-016629] N84-13563
Thermal modeling of laser welding with a quasi-1-dimensional approach
[DE84-001292] N84-13585
Kriging of geological and physical parameters from Yucca Flat, NTS
[DE83-018227] N84-13625
ALUMINUM ALLOYS
Galvanic coupling between D6AC steel, 6061-T6 aluminum, Inconel 718 and graphite-epoxy composite material: Corrosion occurrence and prevention
[NASA-TP-2236] N84-13263
The localized corrosion of aluminum alloys: A review
[AD-A132582] N84-13269
Characterization of the structure and substructure of thermally transformation cycled Cu-Zn-Al shape memory alloys
[AD-A132341] N84-13270
Segregation and domain structure in rapidly solidified Ni3Al
[DE83-017188] N84-13306
Low-hysteresis materials for magnetic refrigeration: Gd sub 1-x/Er sub x/Al2
[DE84-001685] N84-13307
ALUMINUM OXIDES
High alumina cement concrete
[CSIR-BRR-573] N84-13311
AMBIPOLAR DIFFUSION
Ambipolarity and transport with resonant ion diffusion in EBT
[DE84-000333] N84-14000
AMERICIUM 241
Aerial radiological survey of Area 11, Nevada Test Site
[DE84-000440] N84-13650
AMMONIA
Atmospheric dispersion of ammonia: An ammonia fog model
[DE84-000165] N84-13689
AMORPHOUS MATERIALS
Effects of compensation on light-induced metastable defects in aSi:H
[DE83-016696] N84-13680
AMPLIFICATION
Computer-aided synthesis and design of monolithic microwave GaAs MESFET amplifiers
[AD-A132474] N84-13452
AMPLIFIER DESIGN
Simulation of a high-gain tapered-wiggler free-electron laser
[DE84-001237] N84-13557
AMPLIFIERS
L band low noise amplifier project
[INPE-2794-PRE/356] N84-13445
Superregenerative amplifier in linear mode as a radar range gate-derivations
[DE84-000978] N84-13474
Channel electron multiplier and optically coupled amplifier used as an incident-flux monitor
[DE84-001451] N84-13539
AMPLITUDES
The amplitude density function and high-resolution frequency analysis of time series
[AD-A132466] N84-13906
Baroclinic waves in the atmosphere of Mars: Observations, linear instability, and finite-amplitude evolution N84-14094
ANALOG TO DIGITAL CONVERTERS
The DJS-054II microcomputer
[AD-A132552] N84-13807
Overview of digital-image processing
[DE84-000156] N84-13848
ANALYTIC FUNCTIONS
The specific solutions of a uniform algebraic differential equation of the second order
[ISSN-0066-1953] N84-13783
On some extensions of a theorem of Hardy and Littlewood N84-13784
On the range of real coefficients of functions with bounded boundary rotation N84-13789
Functions of uniformly bounded characteristic N84-13802
ANALYTIC GEOMETRY
Regular n-gons and Fuchsian groups N84-13798
ANALYZERS
The determination of research/octane number of gasoline fuels by octane analyzer
[AD-A132427] N84-13335
ANEMOMETERS
Study of the contained air flow in a radial tire: Experimental
[DE84-000840] N84-13591
ANGLES (GEOMETRY)
A vertical wind angle standard deviation calculation method for the unstable surface boundary layer
[AD-A132362] N84-13739
ANGULAR DISTRIBUTION
Recent developments in the understanding of pion-nucleus scattering
[DE84-001017] N84-13942
Statistical properties of deep inelastic reactions
[DE84-000722] N84-13943
ANGULAR VELOCITY
An experimental study of multi-link models of human postural dynamics and control N84-13769
ANIMALS
NASA space biology accomplishments, 1982
[NASA-TM-86244] N84-13206
ANIONS
Battery transport data
[DE84-001640] N84-13462
Summary of the status of negative-ion-based neutral beams
[DE84-001328] N84-13948
ANISOTROPY
Absolute determination of stress in textured materials
[DE83-018083] N84-13621
ANNEALING
X-ray and backscattering analysis of ion implantation phenomena in GaAs and related compounds
[AD-A132429] N84-14038
Determining stresses in the presence of nonlinearities in interplanar spacing versus Sin squared Psi
[AD-A132365] N84-14041
ANNIHILATION REACTIONS
The e-+e- collisions in the multi-TeV region
[DE84-000993] N84-13968

ANNUAL VARIATIONS
Seasonal soybean crop reflectance
[E84-10049] N84-13642
Observations and theory of irregularities of middle latitude sporadic E layers N84-13703
ANNULAR NOZZLES
Inverted velocity profile semi-annular nozzle jet exhaust noise experiments
[NASA-TM-83525] N84-13924
ANODES
Decoupling ion efficiency from impedance in pulsed power diodes
[DE83-018114] N84-13470
Analysis of mechanisms for anode plasma formation in ion diodes
[DE83-017793] N84-14010
ANTENNA ARRAYS
Nulling with limited degrees of freedom
[AD-A132276] N84-13424
Adaptive array behavior with periodic phase modulated interference
[AD-A132229] N84-13427
ANTENNA COMPONENTS
NASTRAN structural model for the large 64-meter antenna pedestal. Part 2: Improved model N84-13412
ANTENNA DESIGN
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(09)] N84-13204
ANTENNA RADIATION PATTERNS
RF performance of a proposed L-band antenna system N84-13410
Nulling with limited degrees of freedom
[AD-A132276] N84-13424
Advanced Hough transform implementations
[AD-A132522] N84-13890
ANTENNAS
Microwave monolithic integrated circuit development for future spaceborne phased array antennas
[NASA-TM-83518] N84-13399
RF performance of a proposed L-band antenna system N84-13410
NASTRAN structural model for the large 64-meter antenna pedestal. Part 2: Improved model N84-13412
External wave-launcher study
[DE84-001124] N84-13441
ANTIKNOCK ADDITIVES
The determination of research octane number of gasoline fuels by octane analyzer
[AD-A132427] N84-13335
Residual shale-oil/diesel-engine operating compatibility program
[DE84-000133] N84-13587
ANTIMATTER
Cosmic ray antimatter and baryon symmetric cosmology
[NASA-TM-83958] N84-14103
APERTURES
Aperture averaging of scintillation for space-to-ground optical communication applications
[AD-A132198] N84-13428
Effects of a finite aperture on the inverse born approximation
[DE83-018066] N84-13930
APPLICATIONS PROGRAMS (COMPUTERS)
FORTH: An unconventional programming language
[INPE-2894-PRE/413] N84-13813
APPROXIMATION
Method of operator splitting or fractional steps and its applications to fluid-dynamic modelling
[DE84-000800] N84-13511
ARCHITECTURE
Human behavior N84-13352
ARCHITECTURE (COMPUTERS)
A microcomputer program package of the USAF stability and control DATCOM
[AD-A132143] N84-13199
Issues in the design and implementation of Act2
[AD-A132326] N84-13826
A technical overview of the National Software Works
[AD-A132320] N84-13827
File migration in distributed computer systems N84-13860
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-3, 206/May-June 1982
[ESA-TT-771] N84-13916
ARGON
Observations of nonlinear behavior in a low-pressure discharge column
[AD-A132321] N84-13996
ARID LANDS
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E84-10050] N84-13643
ARIZONA
Stratified maximum temperature relationships between sixteen zone stations in Arizona and respective key stations
[PB83-249904] N84-13746
ARMOR
Feasibility of using a large press (80,000 - 200,000 tons) for manufacturing future components on Army systems
[AD-A132398] N84-13582
AROMATIC COMPOUNDS
Far infrared studies on superconductors and heat-capacity studies on liquid crystals
[DE84-001105] N84-14046
ARPA COMPUTER NETWORK
A technical overview of the National Software Works
[AD-A132320] N84-13827
ARRAYS
Wafer-scale integration of systolic arrays
[AD-A132536] N84-13450
ARRIVALS
Aircraft accident report - A. E. Staley Manufacturing Company, Inc., Canadair Challenger CL-600, N805C, Hailey, Idaho, January 3, 1983
[PB83-910405] N84-13169
ARSENIC
Effects of simultaneous phosphorus and arsenic diffusions on emitter push and dislocation generation
[AD-A132331] N84-14042
ARTIFICIAL INTELLIGENCE
Four frames suffice. A provisionary model of vision and space
[AD-A132359] N84-13825
Issues in the design and implementation of Act2
[AD-A132326] N84-13826
Artificial intelligence techniques for industrial applications in job shop scheduling
[AD-A132164] N84-13867
ASTRONOMICAL TELESCOPES
A very large array 1411 MHz radio survey: Properties of complete samples of radio and optically selected QSO candidates in a high galactic-latitude field N84-14076
ASTROPHYSICS
Review of astrophysical research at Los Alamos
[DE83-017304] N84-14091
ASYMPTOTIC METHODS
Asymptotic optimality of shortest path routing
[AD-A132280] N84-13423
ASYMPTOTIC SERIES
Asymptotic null and nonnull distributions of three multivariate test statistics in Gmanova
[TR-82] N84-13905
ATMOSPHERIC ATTENUATION
Computed survey spectra of 2-5 micron atmospheric absorption
[AD-A132526] N84-13708
ATMOSPHERIC BOUNDARY LAYER
Surface heat flux derived from sodar amplitude and frequency data: A comparison
[DE83-017930] N84-13717
Statistical analysis of turbulence data from the NASA Marshall Space Flight Center atmospheric boundary layer tower array facility --- statistical correlations for aircraft design
[NASA-CR-3737] N84-13730
ATMOSPHERIC CHEMISTRY
Oxygen-18 measurements in the assessment of natural and anthropogenic sulfur in the environment
[DE84-000566] N84-13690
Proceedings of a Workshop on Assessment of Techniques for Measuring Tropospheric N sub x O sub y
[NASA-CP-2292] N84-13706
Radiative transfer and photochemistry in the upper atmosphere of Jupiter N84-14095
ATMOSPHERIC COMPOSITION
Atmospheric retention of anthropogenic CO2: Scenario dependence of the airborne fraction
[DE83-016854] N84-13723
ATMOSPHERIC CORRECTION
In-flight absolute radiometric calibration of the thematic mapper
[E84-10044] N84-13637
Recommended values of the humidity correction factor k sub h for determining exposure in an X-ray beam with free-air chambers
[JEN-542] N84-13915
ATMOSPHERIC DENSITY
On the determination of the index of refraction of the atmosphere
[AD-A132107] N84-13713
ATMOSPHERIC HEAT BUDGET
Response of the North American corn belt to climate warming, CO2
[DE83-017873] N84-13721
ATMOSPHERIC MODELS
Statistical analysis of turbulence data from the NASA Marshall Space Flight Center atmospheric boundary layer tower array facility --- statistical correlations for aircraft design
[NASA-CR-3737] N84-13730
Range reference atmosphere 0-70 km altitude
[AD-A132487] N84-13737
White Sands Missile Range, New Mexico Range reference atmosphere 0-70 km altitude
[AD-A132471] N84-13738
ATMOSPHERIC PHYSICS
Analytical investigation of meso-scale boundary layer forced by surface temperature variation in a stratified sheared atmosphere N84-13702
Air mass computer program for atmospheric transmittance/radiance calculation: FSCATM
[AD-A132108] N84-13712
ATMOSPHERIC PRESSURE
Range reference atmosphere 0-70 km altitude
[AD-A132487] N84-13737
White Sands Missile Range, New Mexico Range reference atmosphere 0-70 km altitude
[AD-A132471] N84-13738
ATMOSPHERIC RADIATION
Spectroradiometric calibration of the thematic mapper and multispectral scanner system
[E84-10045] N84-13638
ATMOSPHERIC REFRACTION
On the determination of the index of refraction of the atmosphere
[AD-A132107] N84-13713
ATMOSPHERIC STRATIFICATION
Analytical investigation of meso-scale boundary layer forced by surface temperature variation in a stratified sheared atmosphere N84-13702
ATMOSPHERIC TEMPERATURE
Range reference atmosphere 0-70 km altitude
[AD-A132487] N84-13737
White Sands Missile Range, New Mexico Range reference atmosphere 0-70 km altitude
[AD-A132471] N84-13738
ATOMIC BEAMS
High-sensitivity laser spectroscopy with atoms from a cooled helium jet
[DE84-000614] N84-13554
Atomic-beam density determination from laser-induced fluorescence interval distributions
[DE84-000677] N84-13571
ATOMIC COLLISIONS
Laser-induced fluorescence line narrowing in atomic vapors
[DE83-018216] N84-13558
ATOMIC ENERGY LEVELS
Liouvillian Green's-function theory of spectral line shape
[AD-A132467] N84-13894
ATOMIC STRUCTURE
Density of occupied d states in transition metal-metalloid metallic glasses
[DE84-001206] N84-13298
ATOMS
Trends in exotic-atom research
[DE84-001679] N84-13974
ATTENUATION
Further investigations of the multiple knife-edge attenuation function
[PB83-245043] N84-13442
Effects of crack closure on ultrasonic transmission
[DE83-018073] N84-13599
ATTITUDE (INCLINATION)
Bank-to-turn control
[AD-A132491] N84-13214
AUDITORY SIGNALS
A study on sound guidance for evacuation: Effect of megaphoned evacuation guidance in smoke N84-13356
AUGER SPECTROSCOPY
Quantitative determination of the intenstities of known components in spectra obtained from surface analytical techniques
[DE84-000926] N84-13239
AURORAL ZONES
Energization of ions by oblique double layers N84-13700
AUSTENITE
Dilatometric investigation of phase-transformation kinetics in HP 9-4-20 steel
[DE84-001180] N84-13280
AUSTENITIC STAINLESS STEELS
Non-uniformity of elastic micro-deformations in austenitic steels
[BLL-M-35357-(5828.4)] N84-13261
Corrosion of ferrous alloys in eutectic lead-lithium environments
[DE84-000593] N84-13292

Mass transfer behavior of a modified austenitic stainless steel in lithium
[DE84-000338] N84-13293
A comparison of the irradiated tensile properties of a high-manganese austenitic steel and type 316 stainless steel
[DE84-000260] N84-13294
Miniaturized disk bend tests of neutron-irradiated path A type alloys
[DE84-001277] N84-13618

AUTOCORRELATION
Algorithms for single-signal and multisignal minimum-cross-entropy spectrum analysis
[AD-A132400] N84-13420

AUTOMATIC CONTROL
Flight-test of the glide-slope track and flare-control laws for an automatic landing system for a powered-lift STOL airplane
[NASA-TP-2128] N84-13198
Automated standard nautical chart production
[AD-A132249] N84-13644

AUTOMATIC TEST EQUIPMENT
Technology assessment: 1983 forecast of future test technology requirements
[AD-A132421] N84-14107

AUTOMOBILE ENGINES
Flywheel rotor and containment technology development, FY83
[DE83-017615] N84-13589

AUTOMOBILE FUELS
Energy-efficient automobiles for the future
[DE84-000600] N84-14073

AUTOMOBILES
The effects of relaxing automobile emission standards: A generic analysis and an urban case study
[DE84-000193] N84-13693
Energy-efficient automobiles for the future
[DE84-000600] N84-14073

AUTOREGRESSIVE PROCESSES
A user's guide to ARSPIQ: The univariate time series analysis program for autoregressive spectral information quantile identification
[AD-A132217] N84-13831
Time series long memory identification and quantile spectral analysis
[AD-A132240] N84-13900

AUXILIARY PROPULSION
Study of auxiliary propulsion requirements for large space systems, volume 2
[NAA-CR-168193] N84-13218

AVERAGE
Averaging procedures of multiphase conservation equations
[DE83-014698] N84-13908

AXIAL STRESS
Biaxial fatigue, a review of the literature
[FRP-82/17] N84-13266
Instruction manual for the use of the CSIR triaxial rock stress measuring equipment
[CSIR-ME-1763] N84-13535

AXISYMMETRIC FLOW
Investigation of axisymmetric confined turbulent jet mixing in the near region with adverse pressure gradient
N84-13148

B

B STARS
A study of A- and B-type stars in the southern galactic halo N84-14077

B-1 AIRCRAFT
Flight test and analyses of the B-1 structural mode control system at supersonic flight conditions
[NASA-CR-170405] N84-13197

BACKSCATTERING
X-ray and backscattering analysis of ion implantation phenomena in GaAs and related compounds
[AD-A132429] N84-14038

BAFFLES
Baffle system employing reflective surfaces
[NASA-TM-84406] N84-13985

BAINITE
Dilatometric investigation of phase-transformation kinetics in HP 9-4-20 steel
[DE84-001180] N84-13280

BANACH SPACE
Convolution of generalized vector measures
N84-13803

BANDWIDTH
Computer-aided synthesis and design of monolithic microwave GaAs MESFET amplifiers
[AD-A132474] N84-13452

BAROCLINIC WAVES
Acoustic-gravity wave dispersion relations in a baroclinic atmosphere
[PB83-248690] N84-13726
Baroclinic Rossby wave signature in a general circulation ocean model
[AD-A132219] N84-13750
Baroclinic waves in the atmosphere of Mars: Observations, linear instability, and finite-amplitude evolution N84-14094

BAROCLINITY
Acoustic-gravity wave dispersion relations in a baroclinic atmosphere
[PB83-248690] N84-13726

BARREN LAND
Photo interpretation key to Michigan land cover/use
[E84-10048] N84-13641

BARYONS
Cosmic ray antimatter and baryon symmetric cosmology
[NASA-TM-83958] N84-14103

BASIC (PROGRAMMING LANGUAGE)
IBM Corporation IBM4341 IBM BASIC release 1.0
[PB82-240945] N84-13852

BATHYMETERS
Data validation and summary for the NRL remote sensing experiment: Phelps Bank, July, 1982. Part 2: Meteorology
[AD-A132105] N84-13646

BAYES THEOREM
A general framework for learning curve reliability growth models
[AD-A132277] N84-13596
Various solutions in multiple Bayesian's decision and multinormal estimation problems
[TR-78] N84-13882

BAYS (TOPOGRAPHIC FEATURES)
Dynamic mass balance of PCB (polychlorinated biphenyls) and suspended solids in Saginaw Bay: A case study
[PB83-250308] N84-13699

BCS THEORY
Far infrared studies on superconductors and heat-capacity studies on liquid crystals
[DE84-001105] N84-14048

BEACON COLLISION AVOIDANCE SYSTEM
Traffic alert and collision avoidance system (TCAS): A functional overview of active TCAS I
[AD-A132281] N84-13171

BEAM CURRENTS
Summary of the status of negative-ion-based neutral beams
[DE84-001328] N84-13948
New concepts in particle acceleration
[DE83-017747] N84-13961

BEAM INJECTION
PR beam-pulse formation and control
[DE84-001354] N84-13936
Summary of the status of negative-ion-based neutral beams
[DE84-001328] N84-13948
Acceleration of heavy ions in the AGS and CBA
[DE83-017762] N84-13963
Construction and operational experience of the tandem mirror experiment-upgrade (TMX-U)
[DE83-018181] N84-13995
Experimental results on finite-beta limits and transport in the ISX-B Tokamak
[DE84-000258] N84-14001

BEAM INTERACTIONS
Wave and particle observations associated with the beam plasma discharge in a space simulation chamber
N84-13210
Colliding-beam-accelerator lattice
[DE83-017875] N84-14050

BEDS (PROCESS ENGINEERING)
Fischer-Tropsch synthesis in slurry reactors: Summary and analysis of the state of the art
[CSIR-CENG-432] N84-13234

BENDING
Miniaturized disk bend tests of neutron-irradiated path A type alloys
[DE84-001277] N84-13618

BENZENE
Investigation of sources, properties and preparation of distillate test fuels
[NASA-CR-168227] N84-13332

BERING SEA
Winter currents on the eastern Bering Sea shelf
[PB83-248823] N84-13753

BERYLLIUM
Comparison of compression properties and swelling of beryllium irradiated at various temperatures
[DE84-000597] N84-13277

BETA PARTICLES
Code BETAL to calculation Alpha/Beta activities in environmental samples
[JEN-549] N84-13818
Theory of optical flashes
[DE84-001450] N84-14106

BETATRONS
Simulation studies on a novel betatron injection scheme
[DE84-001337] N84-13946

BIAS
A rectangular gate merged MOSBJT
[AD-A132450] N84-13453

BIBLIOGRAPHIES
Aeronautical Engineering, a continuing bibliography with indexes
[NASA-SP-7037(166)] N84-13136
Aeronautical Engineering: A continuing bibliography with indexes (supplement 167)
[NASA-SP-7037(167)] N84-13137
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(09)] N84-13204
Annotated bibliography of battery evaluations
[DE84-000653] N84-13466
Proceedings of the 3rd LAN-Transport Workshop. Report of the third workshop for local area network implementors of the NBS specifications of the International Standards Organization transport class 4 protocol: Special interest group on file transfer protocol
[PB83-251348] N84-13657
Glaciological data: Permafrost. A bibliography, 1978 - 1982
[PB83-249730] N84-13724
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 251)
[NASA-SP-7011(251)] N84-13767
Research activities that occurred in the Coordinated Science Laboratory for July 1, 1982 through Jun 30, 1983
[AD-A132132] N84-14108

BIHARMONIC EQUATIONS
Positive biharmonic functions N84-13786

BINARY ALLOYS
Modeling binary-alloy solidification processes: Numerical implementation
[DE84-001587] N84-13284

BINARY DIGITS
Impossibility of distributed consensus with one faulty process
[AD-A132503] N84-13823

BINARY MIXTURES
Prediction of multicomponent liquid-mixture viscosity from binary thermodynamic data
[DE83-011934] N84-13524

BINARY STARS
Studies of cataclysmic variables N84-14084
Theory of optical flashes
[DE84-001450] N84-14106

BIOASSAY
Calibration of laboratory bioassays with results from microcosms and ponds
[DE83-017224] N84-13692

BIOGEOCHEMISTRY
Oxygen-18 measurements in the assessment of natural and anthropogenic sulfur in the environment
[DE84-000566] N84-13690
Dissolved organic matter and lake metabolism: Biochemistry and controls of nutrient flux dynamics in lakes
[DE83-016789] N84-13761

BIOLOGICAL EFFECTS
Effect of carbon monoxide (CO) on firefighters
N84-13357
Fates and biological effects of polycyclic aromatic hydrocarbons in aquatic systems
[PB83-250191] N84-13698
Early mechanisms in radiation-induced biological damage
[DE84-001511] N84-13765
Respiration of roots response to low O2 stress
[DE83-017495] N84-13766
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 251)
[NASA-SP-7011(251)] N84-13767

BIOMASS
The hardwood resource on nonindustrial private forest land in the southeast Piedmont
[PB83-252759] N84-13683

BIOREACTORS
Analysis and modeling of photosynthetic bacterial hydrogen production plants
[DE84-000003] N84-13758

BIPOLAR TRANSISTORS
A rectangular gate merged MOSBJT
[AD-A132450] N84-13453

The BJT-JFET: A novel merged device structure
[AD-A132373] N84-13454
Numerical modeling of the MOSBJT
[AD-A132351] N84-13456
BIRDS
Use of fauna as biomonitors
[DE83-016082] N84-13762
BLACK HILLS (SD-WY)
Analysis of the quality of image data acquired by the LANDSAT-4 Thematic Mapper (TM) of the Black Hills area, South Dakota
[E84-10041] N84-13634
BLACK HOLES (ASTRONOMY)
Self-consistent spherical accretion and models of quasars N84-14088
BLADE TIPS
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-4, 209/July-August 1982
[ESA-TT-781] N84-13141
BLANKETS (FUSION REACTORS)
Influence of a flowing-lithium environment on the fatigue and tensile properties of type 316 stainless steel
[DE84-000611] N84-13295
Low-activation fusion-reactor design studies
[DE83-017688] N84-14014
Materials needs for compact fusion reactors
[DE84-001366] N84-14031
BLOOD
Study of biological samples obtained from victims of MGM Grand Hotel fire N84-13374
BLUNT BODIES
An analytical method to calculate the flow field about blunt bodies of revolution at incidence in supersonic free stream flow
[CSIR-NIAST-82/72] N84-13156
BOEING 747 AIRCRAFT
Work done to determine the source of errors on conditioned pressure transduce signals in the JT9D-7F turbofan engines used on SAA Boeing 747 aircraft
[NIAST-82/78] N84-13192
BOLOMETERS
Far infrared studies on superconductors and heat-capacity studies on liquid crystals
[DE84-001105] N84-14046
BOLTS
Improving the fatigue performance of thick aluminum alloy bolted joints by hole cold-expansion and the use of interference-fit steel bushes
[ARL-STRUC-NOTE-486] N84-13578
BOLZA PROBLEMS
Study of the optimal control problem solving in the Bolza form by the finite element method
[INPE-2750-PRE/326] N84-13884
BONDING
Fiber composite materials research in the UK: Assessment report
[AD-A132386] N84-13226
Cell-substrate bonding system design and development
[DE84-000963] N84-13678
BOOLEAN ALGEBRA
Splice and Malcev algebras N84-13911
BOREHOLES
Petrographic examination of Bell Canyon Tests (BCT) 1-FF field grouts over a 3-year period
[DE83-018226] N84-13654
Seismic investigation of the Multi-Well Experiment site
[DE84-000943] N84-13655
Marine seismic System(MSS) deployment. Phase IV: Investigation of techniques and deployment scenarios for installation of tri-axial seismometer in a borehole in the deep ocean
[AD-A132300] N84-13710
BORN APPROXIMATION
Ultrasonic 3-D reconstruction of inclusions in solids using the inverse Born algorithm
[DE83-018082] N84-13928
Effects of a finite aperture on the inverse born approximation
[DE83-018086] N84-13930
BORN-OPPENHEIMER APPROXIMATION
Shock induced molecular excitation in solids
[AD-A132236] N84-13935
BOUNDARIES
The emergence and propagation of a phase boundary in an elastic bar
[AD-A132275] N84-13616
On the Harnack constant and the boundary behavior of Harnack functions N84-13796
Quasiconformal mappings with free boundary components N84-13801
BOUNDARY INTEGRAL METHOD
Three-dimensional analysis of chevron-notched specimens by boundary integral method
[NASA-CR-172225] N84-13607
BOUNDARY LAYER FLOW
High altitude aerodynamic tests with simulated heat-shield outgassing
[AD-A132078] N84-13227
Embedded cavity drag in steady and unsteady flows
[NASA-CR-172275] N84-13493
BOUNDARY LAYER STABILITY
A vertical wind angle standard deviation calculation method for the unstable surface boundary layer
[AD-A132362] N84-13739
BOUNDARY LAYERS
Computation of turbulent reacting flows: Comparison of various mixing/chemistry interaction models
[DE84-000998] N84-13514
Analytical investigation of meso-scale boundary layer forced by surface temperature variation in a stratified sheared atmosphere N84-13702
SRL lethersonde and echosonde data, Anderson Creek Valley, California
[DE84-001680] N84-13715
BOUNDARY VALUE PROBLEMS
Calculations of composition boundaries of saturated phases
[DE84-001665] N84-13274
The emergence and propagation of a phase boundary in an elastic bar
[AD-A132275] N84-13616
On the range of real coefficients of functions with bounded boundary rotation N84-13789
On quasi-parabolic problems with normal boundary conditions N84-13797
On interpolation methods for boundary value ordinary differential equations N84-13869
Solution of the 2-point boundary value problems of optimal spacecraft rotational maneuvers N84-13870
The plane stress/strain analysis of non-homogeneous continua by the boundary integral equation method
[TR-821S] N84-13880
Remarks on the Kuramoto-Sivashinsky equation
[DE84-001018] N84-13901
An introduction to the parabolic equation for acoustic propagation
[AD-A132315] N84-13925
BRAIN
Event-related brain potentials: An alternative methodology for neurotoxicological research
[PB83-246116] N84-13775
BRANCHING (MATHEMATICS)
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-2, 207/March-April 1982
[ESA-TT-759] N84-13143
Bifurcation theory applied to the study of control losses on combat aircraft N84-13144
BRAYTON CYCLE
A rotary vane open reversed Brayton cycle air conditioning and refrigeration system N84-13574
BRAZIL
Geologic survey in the south-central region of Mato Grosso
[E84-10039] N84-13632
Rise in the frequency of cloud cover in LANDSAT data for the period 1973 to 1981 — Brazil
[E84-10047] N84-13640
BRAZING
Low-cycle fatigue behavior of oxygen-free high-conductivity copper at 3000C in high vacuum
[DE84-000725] N84-13305
Copper-manganese-base silverless brazing systems
[PB83-250100] N84-13593
BREAKDOWN
Air-breakdown limits for microwave-pulse propagation. Part 1. Experiments
[DE83-017832] N84-13438
BREMSSTRAHLUNG
A study of thick-target X-ray spectra using photonuclear reactions
[AD-A132543] N84-13934
BRIGHTNESS DISTRIBUTION
Eclipse mapping of accretion disks in cataclysmic binaries N84-14080
BRILLOUIN EFFECT
Absolutely unstable stimulated Brillouin scattering and 2-plasmon decay
[DE84-000823] N84-14032
BRINES
Petrographic examination of Bell Canyon Tests (BCT) 1-FF field grouts over a 3-year period
[DE83-018226] N84-13654
BRITTLENESS
Cobalt ion-containing epoxies
[NASA-TM-85715] N84-13309
BROMIDES
Performance test results of an absorption heat pump which is designed to utilize low-temperature 600C (1400F) industrial waste heat
[DE83-017194] N84-13533
BUBBLES
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 2. Dual-ion irradiations
[DE84-001297] N84-13282
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 1: Microstructural response to neutron irradiation
[DE84-001298] N84-13283
Physical modeling of the champagne effect
[DE84-001813] N84-13388
BUCKLING
Stability, vibration and passive damping of partially restrained imperfect columns
[NASA-TM-85697] N84-13608
BUILDINGS
Building systems and smoke control N84-13348
Human behavior N84-13352
Lateral-torsional response of structures subjected to seismic waves
[PB83-239582] N84-13390
BUMPY TORUSES
Ambipolarity and transport with resonant ion diffusion in EBT
[DE84-000333] N84-14000
BUOYANCY
Multiple steady states of buoyancy induced flow in cold water and their stability N84-13487
Modelling of submerged cable dynamics
[AD-A132495] N84-13580
BURNING RATE
A comment on the plateau combustion mechanism of the double-base propellants
[AD-A132551] N84-13333
Recent US progress in fire growth modeling N84-13354
Fire modeling research at Factory Mutual N84-13370
BUSHINGS
Improving the fatigue performance of thick aluminum alloy bolted joints by hole cold-expansion and the use of interference-fit steel bushes
[ARL-STRUC-NOTE-486] N84-13578
BUTADIENE
Diffusion and sorption of cyclohexane vapor in SBS and SBR copolymers
[AD-A132397] N84-13315
BUTANES
Thermal and hydraulic performance of a sieve-tray direct-contact heat exchanger
[DE84-000663] N84-13531
BUTT JOINTS
Welding deformations and residual stresses due to circumferential welding of cylindrical shells and hemispherical end plates
[DRIC-T-6968] N84-13602

C

C BAND
Operational applications of military test ranges in space transportation system programs
[AD-A132535] N84-13217
CABLES (ROPES)
Current researches on fire retardant materials in Japan N84-13342
Modelling of submerged cable dynamics
[AD-A132495] N84-13580
User's manual for CABLE: A three-dimensional, finite-segment computer code for submerged and partially submerged cable systems
[AD-A132515] N84-13821
CADMIUM
Battery transport data
[DE84-001640] N84-13462
CADMIUM SULFIDES
Design analysis of advanced photovoltaic technologies
[DE84-000008] N84-13675
CALCITE
Stress-wave experiments on selected crustal rocks and minerals
[DE84-001613] N84-13714
CALCULATORS
Mathematical model of electrostatic precipitation for the Texas Instruments Programmable 59 calculator
[PB83-261669] N84-13695
Design and implementation of a BASIC cross-compiler and virtual memory management system for the TI-59 programmable calculator
[AD-A132172] N84-13808
CALCULUS OF VARIATIONS
Variational method for adaptive grid generation
[DE83-017312] N84-13850
The MHD stability of inertia-tied Z-pinches with application to solar coronal loops N84-13932

CALIBRATING
A study of the charged particle calibration requirements for the Deep Space Network N84-13414
Aethalometer: An instrument for the real-time measurement of optical absorption by aerosol particles [DE84-000400] N84-13538
Coordinate-measuring machine capability [DE84-002014] N84-13544
Description of a method and artifact for estimating volumetric uncertainty of coordinate measuring machines [DE84-002017] N84-13545
In-flight absolute radiometric calibration of the thematic mapper [E84-10044] N84-13637
Spectroradiometric calibration of the thematic mapper and multispectral scanner system [E84-10045] N84-13638
Parametric model for peak flow prediction in ungaged ephemeral watersheds [PB83-249698] N84-13658
Calibration of laboratory bioassays with results from microcosms and ponds [DE83-017224] N84-13692
Telescope calibration for gamma spectroscopy with a new Ge(Li) diode configuration [INPE-2885-PRE/407] N84-14083

CALIFORNIA
Characterization of reactants, reaction mechanisms and reaction products leading to extreme acid rain and acid aerosol conditions in southern California [PB83-252825] N84-13697
SRL tethersonde and echosonde data, Anderson Creek Valley, California [DE84-001680] N84-13715

CALORIMETERS
Measurement of thermal conductivity from high-temperature pulse diffusivity and calorimetry measurements [DE84-000353] N84-13297

CANOPIES (VEGETATION)
Seasonal soybean crop reflectance [E84-10049] N84-13642

CANS
Flame radiation and liner heat transfer in a tubular-can combustor [NASA-TM-83538] N84-13188

CANTILEVER BEAMS
An improved finite-difference analysis of uncoupled vibrations of tapered cantilever beams [NASA-TM-83495] N84-13610

CANYONS
Petrographic examination of Bell Canyon Tests (BCT) 1-FF field grouts over a 3-year period [DE83-018226] N84-13654

CAPACITORS
Plasma polymerized high energy density dielectric films for capacitors [NASA-CR-168233] N84-13310
A programmable controller with overcurrent latch for constant primary peak current in capacitor-charging FET switcher for Nova [DE83-018184] N84-13569
Infant-mortality testing of high-energy-density capacitors used on Nova [DE83-018027] N84-14028

CARBOHYDRATES
Yields photosynthetic efficiencies, and proximate chemical composition of dense cultures of marine microalgae, a subcontract report [DE83-011992] N84-13757

CARBON
Aethalometer: An instrument for the real-time measurement of optical absorption by aerosol particles [DE84-000400] N84-13538

CARBON COMPOUNDS
Processing science for AS/3501-6 carbon/epoxy composites [AD-A132323] N84-13316

CARBON CYCLE
Deforestation measured by LANDSAT: Steps toward a method [DE83-016645] N84-13652
Commentary on the recent CO2-climate controversy [DE83-016367] N84-13722
Atmospheric retention of anthropogenic CO2: Scenario dependence of the airborne fraction [DE83-016854] N84-13723

CARBON DIOXIDE CONCENTRATION
Response of the North American corn belt to climate warming, CO2 [DE83-017873] N84-13721
Commentary on the recent CO2-climate controversy [DE83-016367] N84-13722
Atmospheric retention of anthropogenic CO2: Scenario dependence of the airborne fraction [DE83-016854] N84-13723

CARBON DIOXIDE LASERS
A survey of electric laser codes [AD-A132352] N84-13551
A frequency stabilization and trigger control unit for hybrid TEA-CO2 lasers [AD-A132247] N84-13552
Laser-plasma interaction at 10.6 microns [DE84-001038] N84-13560
Development of recuperator manufacturing techniques, phase 2 [AD-A132448] N84-13581

CARBON FIBER REINFORCED PLASTICS
Characterization of carbon fiber composites using acousto-ultrasonic techniques [AD-A132305] N84-13317

CARBON MONOXIDE
N(2) and CO vibrational CARS and h(2) rotational CARS spectroscopy of CH(4)-N(2)O flames [AD-A132234] N84-13238
Effect of carbon monoxide (CO) on firefighters N84-13357

CARBON MONOXIDE LASERS
A survey of electric laser codes [AD-A132352] N84-13551

CARBON MONOXIDE POISONING
Effect of carbon monoxide (CO) on firefighters N84-13357
Dependence of evolution of toxic gases on burning conditions N84-13377

CARBON STEELS
Testing of epoxy-phenolic coating for lining carbon steel pipe [DE84-90073] N84-13322

CARBON-CARBON COMPOSITES
Theoretical basis for design of thermal-stress-free fasteners [NASA-TP-2226] N84-13614

CARBOXYHEMOGLOBIN TEST
Study of biological samples obtained from victims of MGM Grand Hotel fire N84-13374
US-Japan cooperative research on evaluation of toxicity N84-13375

CARBOXYLIC ACIDS
Nuclear-medicine [DE84-000346] N84-13759

CASES (CONTAINERS)
Automatic sprinklers N84-13346

CASSEGRAIN ANTENNAS
Deformable subreflector computed by geometric optics N84-13407

CASTINGS
Electrochemical etching of titanium-alloy castings [DE84-000244] N84-13286

CATALOGS (PUBLICATIONS)
Natural hazards photograph catalog, key to geophysical records documentation no. 20 [PB83-250415] N84-13674

CATALYSIS
Surface science study of selective ethylene epoxidation catalyzed by the Ag(110) surface: Structural sensitivity [DE84-001324] N84-13246

CATALYSTS
Selective catalytic hydrogenation of polynuclear heteroaromatic nitrogen compounds with polymer-supported transition-metal compounds [DE84-001326] N84-13248
Safety studies on Li/SOCl-2 reserve battery [AD-A132279] N84-13458

CATHODES
The effect of the structure of metallo-organic complexes on the electrolytic precipitation of titanium and niobium from nonaqueous electrolytes [BLL-OA-TRANS-3070-(6196.3)] N84-13259
Microwave generators: Oscillating virtual cathodes and reflexing electrons [DE84-001346] N84-13433
Solubility of the NiO fuel-cell cathode in Li2CO3 melts as determined by cyclic voltammetry [DE83-014311] N84-13485

CATIONS
Nuclear-medicine [DE84-000346] N84-13759

CAVITATION FLOW
An analysis of the interaction between a submerged jet and a receiver-diffuser in a reverse-flow diverter [DE83-012593] N84-13521

CAVITIES
Embedded cavity drag in steady and unsteady flows [NASA-CR-172275] N84-13493
Component temperature versus laser-welding parameters [DE84-000362] N84-13559

CAVITY RESONATORS
High-Q perpendicular-biased ferrite-tuned cavity [DE83-017291] N84-13478
Microwave nondestructive evaluation of composites [DE84-001777] N84-13601
Beam dynamics in the Advanced Test Accelerator (ATA) [DE84-001421] N84-13947
Surface properties of metal-nitride and metal-carbide films deposited on Nb for RF superconductivity [DE84-001491] N84-14055

CDC COMPUTERS
Network file-storage system [DE84-001068] N84-13863

CELESTIAL MECHANICS
A study of A- and B-type stars in the southern galactic halo N84-14077

CELLS (BIOLOGY)
Kinetic and spectroscopic studies of cytochrome b-563 in isolated cytochrome b/f complex and in thylakoid membranes [DE83-017982] N84-13760

CEMENTS
High alumina cement concrete [CSIR-BRR-573] N84-13311

CENTRAL NERVOUS SYSTEM
The effects of hyperbaric elemental gases on the rate coefficient of K(+) influx in mammalian synaptosomes N84-13754

CENTRIFUGAL COMPRESSORS
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-6, 211/November-Decemter 1982 [ESA-TT-801] N84-13382

CENTRIFUGAL PUMPS
A helium refrigerator with features for supercritical pressure cooling [DE84-017759] N84-13383

CENTRIFUGING
Coil planet centrifugation as a means for small particle separation [NASA-TM-82561] N84-13756

CERAMICS
Characterization of ceramic vane materials for 10KW turboalternator [AD-A132505] N84-13198
Mechanisms of elevated-temperature rupture in single-phase ceramics [DE83-017779] N84-13327
Automated thermal conductivity probe and applications to powders [DE84-000451] N84-13328
Structural performance of ceramics in a high-fluence fusion environment [DE84-001311] N84-13329
Sizing defects using annular-array techniques with an automated ultrasonic data-acquisition system [DE84-001644] N84-13597
Three-dimensional analysis of chevron-notched specimens by boundary integral method [NASA-CR-172225] N84-13607

CERMETS
Low-power radiation-hard GaAs RAM [AD-A132325] N84-13457

CERTIFICATION
Pressure system recertification at NASA-Langley Research Center [NASA-TM-85733] N84-13576

CESIUM
The organic geochemistry of deep ground waters and radionuclide-partitioning experiment: Under hydrothermal conditions [DE83-015784] N84-13651

CESIUM IODIDES
Deposition of cesium iodide on papylene [DE83-017839] N84-13992

CESIUM 137
Aerial radiological survey of Area 11, Nevada Test Site [DE84-000440] N84-13650

CHANNELS (DATA TRANSMISSION)
Standard NIM digital bus (NIM/GPIE) [DE83-017865] N84-13435

CHARACTER RECOGNITION
The effects of character stroke width on the visibility of a head-coupled display [AD-A132046] N84-13183

CHARACTERIZATION
Characterization of carbon fiber composites using acousto-ultrasonic techniques [AD-A132305] N84-13317

CHARGE COUPLED DEVICES
Overview of digital-image processing [DE84-000156] N84-13848

CHARGE DISTRIBUTION
Calculation of ion charge-state distribution in ECR ion sources
[DE84-000517] N84-13957
CHARGE EFFICIENCY
Application features and considerations in advanced lead-acid and nickel/iron EV batteries
[DE83-017936] N84-13472
CHARGE EXCHANGE
Recent developments in the understanding of pion-nucleus scattering
[DE84-001017] N84-13942
Calculation of ion charge-state distribution in ECR ion sources
[DE84-000517] N84-13957
Investigation of the dynamics and threshold behavior of endothermic negative ion-neutral reactions
[DE84-001369] N84-13975
CHARGED PARTICLES
Wave and particle observations associated with the beam plasma discharge in a space simulation chamber N84-13210
Fracto-emission from polymers
[AD-A132462] N84-13314
A study of the charged particle calibration requirements for the Deep Space Network N84-13414
PATH: A lumped-element beam-transport simulation program with space charge
[DE84-001330] N84-13953
CHARM (PARTICLE PHYSICS)
Multiquark exotics
[DE83-017958] N84-13964
Theoretical perspectives on strange physics
[DE83-018085] N84-13965
CHECKOUT
The design and implementation of debugging systems for languages with advanced control structures N84-13811
CHEMICAL ANALYSIS
A gas turbine combustor test facility for fuel composition investigations
[AD-A132479] N84-13201
Laser-induced fluorescence spectroscopy for improved chemical analysis
[DE84-000629] N84-13243
Aging of polymeric materials
[AD-A132250] N84-13318
Improved polymers for enhanced-oil-recovery synthesis and rheology
[DE83-017371] N84-13324
The determination of research octane number of gasoline fuels by octane analyzer
[AD-A132427] N84-13335
Assessment of quality of data on tapes from the hydrogeochemical and stream sediment reconnaissance
[DE83-017697] N84-13647
Characterization of reactants, reaction mechanisms and reaction products leading to extreme acid rain and acid aerosol conditions in southern California
[PB83-252825] N84-13697
The Crab Nebula: A theoretical and observational study N84-14074
CHEMICAL ATTACK
The localized corrosion of aluminum alloys: A review
[AD-A132582] N84-13269
CHEMICAL COMPOSITION
A gas turbine combustor test facility for fuel composition investigations
[AD-A132479] N84-13201
Spectrographic investigation of gold by Grimm lamp
[CSIR-SR-283] N84-13233
Molecular basis for local compositions in liquid-mixture models
[DE83-016604] N84-13250
Calculations of composition boundaries of saturated phases
[DE84-001665] N84-13274
The determination of research octane number of gasoline fuels by octane analyzer
[AD-A132427] N84-13335
Solid-oxide fuel cells
[DE83-017925] N84-13469
Measurement of friction and wear on modified surfaces
[AD-A132364] N84-13583
Yields photosynthetic efficiencies, and proximate chemical composition of dense cultures of marine microalgae, a subcontract report
[DE83-011992] N84-13757
An abundance analysis of the cool barium stars N84-14087
CHEMICAL REACTIONS
Positive ion-molecule reactions in OCS/hydrocarbon mixtures
[AD-A132350] N84-13237
CI: A computer program for calculation of contact indexes which will correct reaction rates evaluated by mean quantities during simulation of turbulent combustion
[DE84-001000] N84-13244
Flame fronts with complex chemical networks
[DE84-001175] N84-13255
Diffusion and sorption of cyclohexane vapor in SBS and SBR copolymers
[AD-A132397] N84-13315
Computation of turbulent reacting flows: Comparison of various mixing/chemistry interaction models
[DE84-000996] N84-13514
CHEMILUMINESCENCE
Characterization of high-temperature vapor-phase species and vapor-solid interactions of import to combustion and gasification processes in the energy technologies
[DE83-015166] N84-13242
CHIPS (ELECTRONICS)
Wafer-scale integration of systolic arrays
[AD-A132536] N84-13450
Computer-aided synthesis and design of monolithic microwave GaAs MESFET amplifiers
[AD-A132474] N84-13452
CHLOROETHYLENE
Vapor degreaser/ultrasonic cleaner solvent evaluation
[DE84-002015] N84-13331
CHONDRITES
Microprobe analyses of rare-earth-element fractionation in meteoritic minerals
[DE83-017326] N84-14097
CHROMATOGRAPHY
Improved polymers for enhanced-oil-recovery synthesis and rheology
[DE83-017371] N84-13324
CHROMIUM
A practical sublimation source for large-scale chromium gettering in fusion devices
[DE84-000724] N84-14002
CHROMIUM ALLOYS
Wear during rubbing of a sintered metal powder body
[AD-A132354] N84-13584
CHROMIUM STEELS
Structures and properties of rapidly solidified 9Cr-1Mo steel
[DE84-001276] N84-13276
Microstructure of 9 Cr-1 MoVNb steel irradiated to 40 dpa at elevated temperatures in HFIR
[DE84-000339] N84-13285
Analysis of hydrogen attack on pressure-vessel steels
[DE84-00061] N84-13301
CHRONOLOGY
Double beta decay: Recent developments and projections
[DE84-000476] N84-13944
CIRCUIT RELIABILITY
INTAC: A computer-aided test interface
[INPE-2792-TDL/138] N84-13446
CITIES
Reflection and identification studies applied to terrain imaging radar
[AD-A132401] N84-13419
The use of thematic mapper data for land cover discrimination: Preliminary results from the UK SATMaP programme
[E84-10038] N84-13631
Stratified maximum temperature relationships between sixteen zone stations in Arizona and respective key stations
[PB83-249904] N84-13745
CIVIL AVIATION
Census of US civil aircraft
[PB83-252460] N84-13147
Deregulating the airlines: An economic analysis
[PB83-250019] N84-14070
CLASSIFICATIONS
On a relation between Maximum-Likelihood classification and Minimum-Cross-Entropy classification
[AD-A132237] N84-13426
CLIMATE
Response of the North American corn belt to climate warming, CO2
[DE83-017873] N84-13721
Commentary on the recent CO2-climate controversy
[DE83-016367] N84-13722
CLIMATOLOGY
Satellite observations of variations in southern hemisphere snow cover
[PB83-252908] N84-13745
Stratified maximum temperature relationships between sixteen zone stations in Arizona and respective key stations
[PB83-249904] N84-13746
CLOUD COVER
Rise in the frequency of cloud cover in LANDSAT data for the period 1973 to 1981 — Brazil
[E84-10047] N84-13640
An analysis of cloud cover at Johannesburg, Cape Town and Durban, in South Africa
[CSIR-NBRI-SR-BOU-60] N84-13734
CLOUDS
Development of a technique for short-term prediction of hydrometeors using advection and physical forcing
[AD-A132259] N84-13740
CLOUDS (METEOROLOGY)
Precipitation development in midlatitude cyclones: A study of cloud structures and processes N84-13728
A numerical study of cloud and precipitation processes in mesoscale rainbands N84-13729
CLUSTER ANALYSIS
Introduction: Advances and opportunities in cluster research
[DE84-000364] N84-13917
CMOS
ESD evaluation of radiation-hardened, high-reliability CMOS and MNOS ICs
[DE84-000138] N84-13481
CN EMISSION
Physiological function of combustion gas and especially that of CN N84-13376
COAL
Selective catalytic hydrogenation of polynuclear heteroaromatic nitrogen compounds with polymer-supported transition-metal compounds
[DE84-001326] N84-13248
COAL DERIVED LIQUIDS
Calibration of laboratory bioassays with results from microcosms and ponds
[DE83-017224] N84-13692
COAL GASIFICATION
Reverse combustion along constant geometry fissures in heterogeneous fuels N84-13232
COAL LIQUEFACTION
Selective catalytic hydrogenation of polynuclear heteroaromatic nitrogen compounds with polymer-supported transition-metal compounds
[DE84-001326] N84-13248
Analysis of hydrogen attack on pressure-vessel steels
[DE84-00061] N84-13301
COALESCING
Loop coalescence in flares and coronal X-ray brightening
[DE83-013070] N84-14099
COATINGS
Investigation of soft X-ray reflective coatings
[DE84-000510] N84-14025
COBALT
Cobalt ion-containing epoxies
[NASA-TM-85715] N84-13309
The organic geochemistry of deep ground waters and radionuclide-partitioning experiment: Under hydrothermal conditions
[DE83-015784] N84-13651
Mobility of organic complexes of nickel and cobalt in soils
[DE83-017897] N84-13720
COBALT ALLOYS
Creep fatigue of low-cobalt superalloys: Waspalloy, PM U 700 and wrought U 700
[NASA-CR-168260] N84-13265
COBOL
Computerized art plotting system. Volume 1: Horizontal bar charts (second edition)
[DE83-018113] N84-13839
Digital Equipment Corporation, VAX 11/750, VAL-11 COBOL version 2.2 (COBOL technical report)
[PB83-241596] N84-13851
Datapoint Corporation Datapoint 8800 RMS COBOL 2.3.A
[PB83-240962] N84-13853
Datapoint Corporation, Datapoint 8800, RMS COBOL 2.3.A
[PB83-241075] N84-13854
Northern Telecom, Incorporated NTI-585 ACOBOL/3 release 3
[PB83-241513] N84-13855
Hewlett Packard HP 3000 series 40, COBOL 11/3000 version A.00.09
[PB83-254805] N84-13858
Hewlett Packard HP 3000 series 40, COBOL 11/3000 version A.00.09 (COBOL technical report)
[PB83-254813] N84-13859
CODE DIVISION MULTIPLE ACCESS
The effects of Reed-Solomon code shortening on the performance of coded telemetry systems N84-13403
CODING
VLSI architectures for computing multiplications and inverses in GF(2-m) N84-13406

A compact optical pulse compressor with computer-generated holographic masks for radar applications
[AD-A132152] N84-13430
Study of potential standardization of video teleconferencing systems. Volume 2: Appendices
[AD-A132061] N84-13431
Study of potential standardization of video teleconferencing systems, volume 1
[AD-A132060] N84-13432
Assessment of quality of data on tapes from the hydrogeochemical and stream sediment reconnaissance
[DE83-017697] N84-13647
Short introduction to office applications of markup language
[DE83-011400] N84-13844

COEFFICIENTS
On the Fatou set of monic polynomials N84-13788
On the range of real coefficients of functions with bounded boundary rotation N84-13789

COGNITION
External versus intuitive reasoning: The conjunction fallacy in probability judgment
[AD-A131801] N84-13778

COLD FLOW TESTS
On some flow characteristics of conventional and excited jets
[NASA-TM-83503] N84-13922

COLD WATER
Multiple steady states of buoyancy induced flow in cold water and their stability N84-13487

COLD WORKING
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 1: Microstructural response to neutron irradiation
[DE84-001298] N84-13283
Improving the fatigue performance of thick aluminum alloy bolted joints by hole cold-expansion and the use of interference-fit steel bushes
[ARL-STRUC-NOTE-486] N84-13578

COLLISION AVOIDANCE
Aircraft accident report - A. E. Staley Manufacturing Company, Inc., Canadair Challenger CL-600, N805C, Hailey, Idaho, January 3, 1983
[PB83-910405] N84-13169
Airborne Intelligent Display (AID) phase 1 software development
[ATC-123] N84-13181

COLLISIONS
Hazardous location identification by computer
[CSIR-TR-RF/6/81] N84-13814

COLOR CENTERS
NdP5O14 crystal used for miniature rangefinder
[AD-A132541] N84-13549

COLOR TELEVISION
An airborne color video inserter
[AD-A132183] N84-13185

COLUMNS (PROCESS ENGINEERING)
Fischer-Tropsch synthesis in slurry reactors: Summary and analysis of the state of the art
[CSIR-CENG-432] N84-13234

COLUMNS (SUPPORTS)
Stability, vibration and passive damping of partially restrained imperfect columns
[NASA-TM-85697] N84-13608

COMBINATORIAL ANALYSIS
Toward a constructive physics
[DE83-016644] N84-13919

COMBINED CYCLE POWER GENERATION
Combined cold compressor/ejector helium-refrigerator cycle
[DE83-017764] N84-13385

COMBUSTION
Reverse combustion along constant geometry fissures in heterogeneous fuels N84-13232
PDF: A computer program for calculation of turbulent combustion utilizing a Probabilty Density Function (PDF) approach
[DE84-000999] N84-13240
CI: A computer program for calculation of contact indexes which will correct reaction rates evaluated by mean quantities during simulation of turbulent combustion
[DE84-001000] N84-13244
The computer fire codes and required new data N84-13369
Flame heights, flame radiation and flame spread N84-13371
Recent progress at NBS in fire growth modeling N84-13372
Response of flame spread phenomena to ambient air stream velocity changes N84-13373
Proposed plan for joint research program between Japan, the USA and Canada concerning gas toxicity in fires N84-13378
Experiments on mixing and combustion with low heat release in a turbulent shear flow N84-13489
Computation of turbulent reacting flows: Comparison of various mixing/chemistry interaction models
[DE84-000998] N84-13514
Residual shale-oil/diesel-engine operating compatibility program
[DE84-000133] N84-13587
Acoustic modelling and analysis of pulsating combustion in a gas-fired pulse burner N84-13921

COMBUSTION CHAMBERS
A theoretical and experimental study of turbulent particle-laden jets
[NASA-CR-168293] N84-13187
Flame radiation and liner heat transfer in a tubular-can combustor
[NASA-TM-83538] N84-13188
A gas turbine combustor test facility for fuel composition investigations
[AD-A132479] N84-13201
An experimental investigation of soot behavior in a gas turbine combustor
[AD-A132210] N84-13202
A study of air breathing rockets. 3: Supersonic mode combustors
[NAL-TR-756] N84-13213

COMBUSTION EFFICIENCY
New modeling of compartment fires and problem of flashover N84-13365

COMBUSTION PHYSICS
A comment on the plateau combustion mechanism of the double-base propellants
[AD-A132551] N84-13333

COMBUSTION PRODUCTS
A gas turbine combustor test facility for fuel composition investigations
[AD-A132479] N84-13201
Current researches on fire retardant materials in Japan N84-13342
Smoke inhalation injury N84-13350
Human behavior N84-13351
US-Japan cooperative research on evaluation of toxicity N84-13375
Physiological function of combustion gas and especially that of CN N84-13376
Dependence of evolution of toxic gases on burning conditions N84-13377

COMMAND AND CONTROL
The development and application of an advanced computer-based shared-graphic workstation for video teleconferencing
[AD-A132583] N84-13817

COMMERCIAL AIRCRAFT
Census of US civil aircraft
[PB83-252460] N84-13147

COMMERCIAL ENERGY
County-level wind resource estimates for DOE Region 5
[DE84-000009] N84-13744

COMMUNICATION CABLES
The effect of water on the dielectric performance of a cable
[BLL-OA-TRANS-2634-(6196.3)] N84-13447
Service experience of EDF 20 kV XLPe insulated cable
[BLL-OA-TRANS-2633-(6196.3)] N84-13448
Radial thermomechanical behaviour
[BLL-OA-TRANS-2639-(6196.3)] N84-13503

COMMUNICATION NETWORKS
Propagation effects on satellite systems at frequencies below 10 GHz, a handbook for satellite systems design, 1st edition
[NASA-RP-1108] N84-13397
A system for the simulation and evaluation of satellite communication networks
[NASA-TM-83531] N84-13400
Wideband integrated Voice/Data technology
[AD-A132284] N84-13421
Asymptotic optimality of shortest path routing
[AD-A132280] N84-13423
NOVANET: Communications network for a control system
[DE83-013862] N84-13436
Service experience of EDF 20 kV XLPe insulated cable
[BLL-OA-TRANS-2633-(6196.3)] N84-13448
Radial thermomechanical behaviour
[BLL-OA-TRANS-2639-(6196.3)] N84-13503

COMMUNICATION SATELLITES
Propagation effects on satellite systems at frequencies below 10 GHz, a handbook for satellite systems design, 1st edition
[NASA-RP-1108] N84-13397
A system for the simulation and evaluation of satellite communication networks
[NASA-TM-83531] N84-13400

COMPARISON
Diffusion and sorption of cyclohexane vapor in SBS and SBR copolymers
[AD-A132397] N84-13315

COMPARTMENTS
Modeling of compartment fires N84-13364
New modeling of compartment fires and problem of flashover N84-13365
Thermal instability in transient compartment fire: An approach to characterize flashover and estimate its mechanisms N84-13366
Recent progress at NBS in fire growth modeling N84-13372

COMPILERS
Design and implementation of a BASIC cross-compiler and virtual memory management system for the TI-59 programmable calculator
[AD-A132172] N84-13606
Digital Equipment Corporation, VAX 11/750, VAL-11 COBOL version 2.2 (COBOL technical report)
[PB83-241596] N84-13851
IBM Corporation IBM4341 IBM BASIC release 1.0
[PB82-240945] N84-13852
Datapoint Corporation Datapoint 8800 RMS COBOL 2.3.A
[PB83-240962] N84-13853
Datapoint Corporation, Datapoint 8800, RMS COBOL 2.3.A
[PB83-241075] N84-13854
Northern Telecom, Incorporated NTI-585 ACOBOL/3 release 3
[PB83-241513] N84-13855
Hewlett Packard HP 3000 series 40, COBOL 11/3000 version A.00.09
[PB83-254805] N84-13858
Hewlett Packard HP 3000 series 40, COBOL 11/3000 version A.00.09 (COBOL technical report)
[PB83-254813] N84-13859

COMPLEX SYSTEMS
On the interactions of incentive and information structures
[DE83-012084] N84-14065

COMPOSITE MATERIALS
INHYD: Computer code for intraply hybrid composite design. A users manual
[NASA-TP-2239] N84-13224
Overview of composites capability at Lawrence Livermore National Laboratory
[DE84-001086] N84-13228
Characterization of glass-filled engineering thermoplastic composites
[DE84-000361] N84-13231
Microwave nondestructive evaluation of composites
[DE84-001777] N84-13601

COMPOSITE STRUCTURES
Flight service evaluation of advanced composite ailerons on the L-1011 transport aircraft
[NASA-CR-172246] N84-13223
Numerical simulation of two dimensional heat transfer in composite bodies with application to de-icing of aircraft components
[NASA-CR-168283] N84-13490

COMPRESSED AIR
Physical modeling of the champagne effect
[DE84-001813] N84-13388

COMPRESSIBILITY
Comparison of compression properties and swelling of beryllium irradiated at various temperatures
[DE84-000597] N84-13277

COMPRESSIBILITY EFFECTS
The compressible aerodynamics of rotating blades based on an acoustic formulation
[NASA-TP-2197] N84-13923

COMPRESSORS
Combined cold compressor/ejector helium-refrigerator cycle
[DE83-017764] N84-13385
Stirling-engine heat-actuated heat pump
[DE83-017137] N84-13529
Parametric testing and evaluation of a free-piston Stirling engine/linear-compressor system
[DE83-017282] N84-13590

COMPTON EFFECT
Inverse comptonization vs. thermal synchrotron
[DE84-001039] N84-14105

COMPUTATION
Generalized plastic hinge concepts for 3D beam-column elements
[PB83-247981] N84-13391
Vectorizing and machine-spanning techniques
[DE84-000469] N84-13810

COMPUTATIONAL FLUID DYNAMICS
XTRAN2L: A program for solving the general-frequency unsteady transonic small disturbance equation
[NASA-TM-85723] N84-13150

Complex eigenvalues for the stability of Couette flow
[NASA-CR-172251] N84-13492
Computation of viscous flow in curved ducts and comparison with experimental data
[NASA-TM-83548] N84-13494
COMPUTATIONAL GRIDS
Variational method for adaptive grid generation
[DE83-017312] N84-13850
Solution of Poisson equations for 3-dimensional grid generations -- computations of a flow field over a thin delta wing
[NASA-TM-85857] N84-13886
COMPUTER AIDED DESIGN
An application of nonlinear programming to the design of regulators of a linear-quadratic formulation
[NASA-CR-17253] N84-13380
Computer-aided synthesis and design of monolithic microwave GaAs MESFET amplifiers
[AD-A132474] N84-13452
Generating three-dimensional surface models of solid objects from multiple projections
[AD-A132392] N84-13824
Automated design of microprocessor-based digital filters
[AD-A132214] N84-13832
COMPUTER AIDED MANUFACTURING
Introduction to flexible manufacturing systems: Their applications, classification, and opportunities
[DE83-017373] N84-13868
COMPUTER AIDED MAPPING
CEREAS: An interactive computer-mapping system for environmental assessments
[DE83-017927] N84-13864
COMPUTER GRAPHICS
Automated thermal conductivity probe and applications to powders
[DE84-000451] N84-13328
The development and application of an advanced computer-based shared-graphic workstation for video teleconferencing
[AD-A132583] N84-13617
Interactive surface visualization using raster graphics
[AD-A132548] N84-13619
Planar embedding of planar graphs
[AD-A132538] N84-13620
Generating three-dimensional surface models of solid objects from multiple projections
[AD-A132392] N84-13624
Development of a GIFTS (graphics-oriented interactive finite-element time-sharing system) plotting package compatible with either PLOT10 or IBM/DSM graphics
[AD-A132195] N84-13633
Developing computer-graphics programs for specialized applications
[DE83-016181] N84-13636
Computerized art plotting system. Volume 1: Horizontal bar charts (second edition)
[DE83-018113] N84-13639
Portable FORTRAN contour-plotting subprogram
[DE83-017422] N84-13646
ANALYSIS/PLOT: A graphics package for use with the SORT/ANALYSIS data bases
[DE83-017886] N84-13847
Advanced Hough transform implementations
[AD-A132522] N84-13890
On bisecting random graphs
[AD-A132500] N84-13892
Multivariate, minimum-curvature splines for randomly spaced data
[AD-A132319] N84-13899
Management and display of data analysis environments for large data sets
[DE84-001414] N84-14069
COMPUTER NETWORKS
Participation of VAX VMS computers in IBM file-transfer networks
[DE83-017945] N84-13838
Network file-storage system
[DE84-001068] N84-13863
Detailed introduction and reference manual for: The network-shared-memory distributed database system
[DE83-017547] N84-13865
TIS: An intelligent gateway computer for information and modeling networks. Overview
[DE83-017986] N84-14067
COMPUTER PROGRAMMING
The programming and validation of the computerised version of the intermediate mental alertness test
[CSIR-PERS-303] N84-13776
Design and implementation of a BASIC cross-compiler and virtual memory management system for the TI-59 programmable calculator
[AD-A132172] N84-13808
The design of backtrack algorithms
[AD-A132299] N84-13828
Utilization of Ada as a program design language
[AD-A132244] N84-13830
COMPUTER PROGRAMS
XTRAN2L: A program for solving the general-frequency unsteady transonic small disturbance equation
[NASA-TM-85723] N84-13150
Specification for a Program for an Interative Aeroelastic Solution (PIAS)
[NASA-CR-172200] N84-13153
PDF: A computer program for calculation of turbulent combustion utilizing a Probabilty Density Function (PDF) approach
[DE84-000999] N84-13240
CI: A computer program for calculation of contact indexes which will correct reaction rates evaluated by mean quantities during simulation of turbulent combustion
[DE84-001000] N84-13244
Thermodynamic surface for water: The formulation and computer programs
[PB83-249789] N84-13256
Computational models for cyclic plasticity, rate dependence and creep in finite element analysis
[PB83-245829] N84-13308
The computer fire codes and required new data
N84-13369
Flame heights, flame radiation and flame spread
N84-13371
Recent progress at NBS in fire growth modeling
N84-13372
Programmer's manual for the fire safety evaluation system cost minimizer computer program
[PB83-251447] N84-13395
Algorithms for single-signal and multisignal minimum-cross-entropy spectrum analysis
[AD-A132400] N84-13420
Calculation of natural convection within a heated enclosure using the method of second moments
[DE84-001596] N84-13517
Oak Ridge heat-pump models. Part 1. A steady-state computer design model for air-to-air heat pumps
[DE84-001577] N84-13519
Probabilistic fatigue life predictions of structural components in high-cycle fatigue regimes
[AD-A132425] N84-13615
Air mass computer program for atmospheric transmittance/radiance calculation: FSCATM
[AD-A132108] N84-13712
Analysis and modeling of photosynthetic bacterial hydrogen production plants
[DE84-000003] N84-13758
Computer-based training starter kit
[PB83-248815] N84-13780
The design and implementation of debugging systems for languages with advanced control structures
N84-13811
PREWATE: An interactive preprocessing computer code to the Weight Analysis of Turbine Engines (WATE) computer code
[NASA-TM-83545] N84-13812
A program for the automatic request of magnetic tapes filing and reading of its contents (processor PCINTA)
[JEN-545] N84-13815
Code BETAL to calculation Alpha/Beta activities in environmental samples
[JEN-549] N84-13816
Formal techniques in the management of software design
[AD-A132569] N84-13818
Model Statement Language/analyzer (MSL/MSA): A top-down Problem Statement Language/analyzer (PSL/PSA) approach for the user dialogue in decision support systems
[AD-A132273] N84-13829
A user's guide to ARSPIQ: The univariate time series analysis program for autoregressive spectral information quantile identification
[AD-A132217] N84-13831
Computer software summaries, numbers 424 through 693
[DE83-015297] N84-13834
FACET: A radiation-view-factor computer code for axisymmetric, 2D planar and 3D geometries with shadowing
[DE84-000359] N84-13835
T-HEMP3D user manual
[DE84-000526] N84-13845
ANALYSIS/PLOT: A graphics package for use with the SORT/ANALYSIS data bases
[DE83-017886] N84-13847
NOSTRUM: A finite element program for nonlinear structural mechanics
[TR-18] N84-13881
Analysis-plot generation code with significance levels computed using Kolmogorov-Smirnov statistics valid for both large and small samples
[DE84-001581] N84-13907
A survey of underwater-acoustic ray tracing techniques
[PB83-250522] N84-13931
ARCHSIM: A proton-synchrotron tracking program, including longitudinal space charge
[DE84-001335] N84-13952
Calculation of ion charge-state distribution in ECR ion sources
[DE84-000517] N84-13957
COMPUTER SYSTEMS DESIGN
Symposium on Computers in Civil Engineering
[CSIR-S-267] N84-13806
COMPUTER SYSTEMS PERFORMANCE
A technical overview of the National Software Works
[AD-A132320] N84-13827
COMPUTER TECHNIQUES
A microcomputer program package of the USAF stability and control DATCOM
[AD-A132143] N84-13199
A compact optical pulse compressor with computer-generated holographic masks for radar applications
[AD-A132152] N84-13430
Fully-coupled solution of pressure-linked fluid flow equations
[DE83-017989] N84-13527
A survey of electric laser codes
[AD-A132352] N84-13551
Development of recuperator manufacturing techniques, phase 2
[AD-A132448] N84-13581
Probabilistic fatigue life predictions of structural components in high-cycle fatigue regimes
[AD-A132425] N84-13615
Automated standard nautical chart production
[AD-A132249] N84-13644
Vectorizing and machine-spanning techniques
[DE84-000469] N84-13810
Impossibility of distributed consensus with one faulty process
[AD-A132503] N84-13823
Investigation in the application of computer-aided process-planning techniques for mechanical engineering at Bendix Kansas City
[DE84-000302] N84-13842
Curve fit technique for a smooth curve using Gaussian sections
[AD-A132499] N84-13893
Computer-based ultrasonic multiple-frequency pulse-echo test system
[AD-A132227] N84-13926
The quantum hall effect N84-14036
COMPUTERIZED SIMULATION
Rotor systems research aircraft: Fixed-wing simulations results
[NASA-TM-85863] N84-13176
CI: A computer program for calculation of contact indexes which will correct reaction rates evaluated by mean quantities during simulation of turbulent combustion
[DE84-001000] N84-13244
Escape and rescue model N84-13361
Fire modeling research at Factory Mutual N84-13370
On smoke control experiments N84-13379
A system for the simulation and evaluation of satellite communication networks
[NASA-TM-83531] N84-13400
Energy consumption analysis of the Venus Deep Space Station (DSS-13) N84-13413
Microwave generators: Oscillating virtual cathodes and reflexing electrons
[DE84-001346] N84-13433
Propagation of a radio-frequency pulsed signal over the Earth. The JOLLY programs
[DE84-000109] N84-13439
Development of a circulating zinc-bromine battery, phase 2
[DE84-001886] N84-13463
Enhancement of the CAVE computer code -- aerodynamic heating package for nose cones and scramjet engine sidewalls
[NASA-CR-3731] N84-13501
Turbulent wall pressure simulation
[AD-A132297] N84-13507
Calculation of natural convection within a heated enclosure using the method of second moments
[DE84-001596] N84-13517
Analysis and modeling of photosynthetic bacterial hydrogen production plants
[DE84-000003] N84-13758
Algorithms for automated diagnosis of faults in physical plant
[DE84-000192] N84-13841
Simulation of shock-induced energy flux in molecular solids
[DE84-001157] N84-14047

The effect of opacity on theoretical models of RR Lyrae stars N84-14081

COMPUTERS
Computer-based training starter kit [PB83-248815] N84-13780

CONCENTRATION (COMPOSITION)
Spectrographic investigation of gold by Grimm lamp [CSIR-SR-263] N84-13233
The effect of surface charge on the rheology of concentrated aqueous quartz suspensions [CSIR-CENG-423] N84-13235
Measurement of friction and wear on modified surfaces [AD-A132364] N84-13583
Design and development of a high-concentration and high-effieciency photovoltaic concentrator using a curved Fresnel lens [DE84-000967] N84-13679

CONCENTRATORS
Photovoltaic concentrators: Recent developments [DE84-001641] N84-13687

CONCENTRIC CYLINDERS
Complex eigenvalues for the stability of Couette flow [NASA-CR-172251] N84-13492

CONCRETES
High alumina cement concrete [CSIR-BRR-573] N84-13311
Detection of cracks on highway pavements [PB83-238204] N84-13389
Development of ultrasonic methods for the nondestructive inspection of concrete [DE83-017923] N84-13929

CONDENSATES
Do pions condense in neutron-star matter? [DE84-000463] N84-14093

CONDENSERS (LIQUEFIERS)
Condensation heat transfer of steam on a single horizontal tube [AD-A132245] N84-13508
An analysis of smooth and axially finned, rotating heat pipe condensers [AD-A132141] N84-13509

CONDENSING
The effect of condensate inundation on steam condensation heat transfer to wire-wrapped tubing [AD-A132175] N84-14060

CONDITIONS
Techniques of condition monitoring and fault diagnosis in industry N84-13595

CONDUCTIVE HEAT TRANSFER
Numerical simulation of two-dimensional heat transfer in composite bodies with application to de-icing of aircraft components [NASA-CR-168283] N84-13490
Use of numerical heat-transfer techniques to analyze thermal-comparator conductivity measurements [DE84-000945] N84-13515

CONES
Theoretical basis for design of thermal-stress-free fasteners [NASA-TP-2226] N84-13614

CONFERENCES
Proceedings of the 6th Joint Panel Meeting: UJNR Panel on Fire Research and Safety N84-13341
International Meeting on Lithium Batteries [AD-A132371] N84-13455
Proceedings of the 4th International Conference on Physicochemical Hydrodynamics [DE83-012765] N84-13532
The 1982 International Congress of Photographic Science [AD-A132372] N84-13536
Proceedings of the Seventh International Conference on High Voltage Electron Microscopy [DE83-016323] N84-13540
The 1980 International Aerospace Conference on Lightning and Static Electricity [CSIR-ELEK-249] N84-13733
Symposium on Computers in Civil Engineering [CSIR-S-267] N84-13806
Scientific program and abstracts [DE83-017620] N84-13967
Proceedings of the Summer Workshop on Proton Decay Experiments [DE83-009572] N84-13980
Separated isotopes: Vital tools for science and medicine [DE83-011646] N84-13981
Fourth Europhysical Conference on Lattice Defects in Ionic Crystals [AD-A132387] N84-14039

CONFORMAL MAPPING
The specific solutions of a uniform algebraic differential equation of the second order [ISSN-0066-1953] N84-13783
Quasiconformal semiflows N84-13792
On the order of quasiregular mappings N84-13793
F-harmonic measure in space N84-13794
On Fuchsian groups of accessible type N84-13795
On L sup p-integrability in PDE's and quasiregular mappings for large exponents N84-13799
Quasiconformal mappings with free boundary components N84-13801
Variational method for adaptive grid generation [DE83-017312] N84-13850
Grid generation for cascades using conformal mapping [NAL-TR-760] N84-13872

CONGRESSIONAL REPORTS
Aircraft navigation technology and errors [GPO-26-859] N84-13170

CONICAL NOZZLES
Inverted velocity profile semi-annular nozzle jet exhaust noise experiments [NASA-TM-83525] N84-13924

CONNECTORS
Standard NIM digital bus (NIM/GPIE) [DE83-017865] N84-13435

CONSERVATION EQUATIONS
Averaging procedures of multiphase conservation equations [DE83-014698] N84-13908

CONSTANTS
On the Harnack constant and the boundary behavior of Harnack functions N84-13796

CONSTRAINTS
Stability, vibration and passive damping of partially restrained imperfect columns [NASA-TM-85697] N84-13608

CONSTRUCTION
Construction and verification of a finite-element method for nonisothermal flows in porous media [DE83-017158] N84-13522

CONSTRUCTION INDUSTRY
Building systems and smoke control N84-13348

CONTAINERS
Flame radiation and liner heat transfer in a tubular-can combustor [NASA-TM-83538] N84-13188

CONTINENTAL SHELVES
Data validation and summary for the NRL remote sensing experiment: Phelps Bank, July, 1982. Part 2: Meteorology [AD-A132105] N84-13646
A satellite study of ocean internal waves [PB83-248708] N84-13661
Winter currents on the eastern Bering Sea shelf [PB83-248823] N84-13753

CONTINUITY (MATHEMATICS)
On some extensions of a theorem of Hardy and Littlewood N84-13784

CONTINUITY EQUATION
Computations of turbulent recirculating flows with fully coupled solution of momentum and continuity equations [DE84-001529] N84-13518
On the singularities of certain nonlinear partial differential equations N84-13787

CONTINUUMS
Nonlinear acoustics in a dispersive continuum: Random waves, radiation pressure, and quantum noise N84-13920

CONTOURS
Interactive surface visualization using raster graphics [AD-A132548] N84-13819
Portable FORTRAN contour-plotting subprogram [DE83-017422] N84-13846

CONTROL
Building systems and smoke control N84-13348

CONTROL SURFACES
Triservice program for extending missile aerodynamic data base and prediction program using rational modeling [AD-A132455] N84-13166

CONTROL THEORY
Bank-to-turn control [AD-A132491] N84-13214
The design and implementation of debugging systems for languages with advanced control structures N84-13811
Concurrency control for resilient nested transactions [AD-A132501] N84-13891
On the interactions of incentive and information structures [DE83-012084] N84-14065

CONTROLLABILITY
Bifurcation theory applied to the study of control losses on combat aircraft N84-13144
Flight test and analyses of the B-1 structural mode control system at supersonic flight conditions [NASA-CR-170405] N84-13197

CONTROLLERS
Bank-to-turn control [AD-A132491] N84-13214
An application of nonlinear programming to the design of regulators of a linear-quadratic formulation [NASA-CR-17253] N84-13380
Signal processor interface simulation of the AN/SPY-1A radar controller [AD-A132170] N84-13429

CONVECTION
Calculation of natural convection within a heated enclosure using the method of second moments [DE84-001596] N84-13517
Experimental study of three-dimensional natural convection at high Rayleigh number [DE83-011982] N84-13530
The influence of convective activity on the vorticity budget [NASA-CR-3752] N84-13736

CONVECTIVE FLOW
Multiple steady states of buoyancy induced flow in cold water and their stability N84-13487

CONVERGENCE
Computations of turbulent recirculating flows with fully coupled solution of momentum and continuity equations [DE84-001529] N84-13518
Acceleration of convergence of vector sequences [NASA-TP-2193] N84-13885

CONVERGENT-DIVERGENT NOZZLES
Investigation of installation effects on twin-engine convergent-divergent nozzles [NASA-TP-2205] N84-13152

CONVOLUTION INTEGRALS
Convolution of generalized vector measures N84-13803

COOLING
Models of simultaneous heat and moisture transfer in soils [DE84-001580] N84-13513
Analysis and modeling of photosynthetic bacterial hydrogen production plants [DE84-000003] N84-13758

COOLING SYSTEMS
Develop and test fuel cell powered on-site integrated total energy systems. Phase 3: Full-scale power plant development [NASA-CR-168294] N84-13672

COORDINATES
Description of a method and artifact for estimating volumetric uncertainty of coordinate measuring machines [DE84-002017] N84-13545

COPOLYMERS
Diffusion and sorption of cyclohexane vapor in SBS and SBR copolymers [AD-A132397] N84-13315
Radiolysis of resist polymers. 2: Poly(haloalkylmethacrylates) and copolymers with methylmethacrylate [AD-A132095] N84-13321
Improved polymers for enhanced-oil-recovery synthesis and rheology [DE83-017371] N84-13324

COPPER
Low-cycle fatigue behavior of oxygen-free high-conductivity copper at 300C in high vacuum [DE84-000725] N84-13305

COPPER ALLOYS
Characterization of the structure and substructure of thermally transformation cycled Cu-Zn-Al shape memory alloys [AD-A132341] N84-13270
Copper-manganese-base silverless brazing systems [PB83-250100] N84-13593

CORIOLIS EFFECT
Intermolecular energy-transfer processes [DE84-000334] N84-13971

CORRELATION
Representativeness of meteorological observations [DE83-017699] N84-13743

CORROSION
In-situ photoacoustic spectrometry for corrosion studies [DE84-001994] N84-13254
The localized corrosion of aluminum alloys: A review [AD-A132582] N84-13269
Corrosion of ferrous alloys in eutectic lead-lithium environments [DE84-000593] N84-13292
Analysis of lead-acid battery accelerated testing data [DE83-017403] N84-13473
Residual shale-oil/diesel-engine operating compatibility program [DE84-000133] N84-13587
Matrix approach to testing mirrors, part 2 [DE83-011996] N84-13676

CORROSION PREVENTION
Galvanic coupling between D6AC steel, 6061-T6 aluminum, Inconel 718 and graphite-epoxy composite material: Corrosion occurrence and prevention
[NASA-TP-2236] N84-13263
Bound and free moisture in explosives and plastics
[DE84-001402] N84-13339
COSMIC RAYS
Cosmic ray antimatter and baryon symmetric cosmology
[NASA-TM-83958] N84-14103
COSMIC X RAYS
Surveys of globular cluster and galactic plane X-ray sources N84-14102
COSMOLOGY
Origin and evolution of the Saturn system
[NASA-TM-85847] N84-14096
Cosmic ray antimatter and baryon symmetric cosmology
[NASA-TM-83958] N84-14103
COST EFFECTIVENESS
Feasibility of using a large press (80,000 - 200,000 tons) for manufacturing future components on Army systems
[AD-A132396] N84-13562
COST ESTIMATES
Design analysis of advanced photovoltaic technologies
[DE84-000008] N84-13675
Collapsible photovoltaic-concentrator array portable power from the Sun
[DE84-000713] N84-13677
Cell-substrate bonding system design and development
[DE84-000963] N84-13678
COST REDUCTION
Programmer's manual for the fire safety evaluation system cost minimizer computer program
[PB83-251447] N84-13395
Evaluating proposed improvements of public rangelands
[PB83-251124] N84-13669
COSTS
Control and operation cost optimization of the HISS cryogenic system
[DE83-017741] N84-13384
COUETTE FLOW
Complex eigenvalues for the stability of Couette flow
[NASA-CR-172251] N84-13492
COUNTER ROTATION
Technology and benefits of aircraft counter rotation propellers
[NASA-CR-168258] N84-13186
COUPLING
Analysis of stability and symmetry implications for ICF
[DE84-000640] N84-13556
Resonance-resonance coupling in dissociative electron attachment
[DE84-001767] N84-13972
COUPLING COEFFICIENTS
Resonant-3-wave mode coupling in inhomogeneous plasmas: Symmetry breaking by omega meson-*
[DE84-001633] N84-13999
CRAB NEBULA
The Crab Nebula: A theoretical and observational study N84-14074
CRACK INITIATION
Creep fatigue of low-cobalt superalloys: Waspalloy, PM U 700 and wrought U 700
[NASA-CR-168260] N84-13265
CRACK PROPAGATION
Biaxial fatigue, a review of the literature
[FRP-82/17] N84-13266
Modeling crack-growth processes in fusion-reactor materials
[DE84-000477] N84-13291
Fracto-emission from polymers
[AD-A132462] N84-13314
Detection of cracks on highway pavements
[PB83-238204] N84-13389
Effects of crack closure on ultrasonic transmission
[DE83-018073] N84-13599
The propagation and arrest of an edge crack in an elastic half-space under conditions of anti-plane shear: Analytical and numerical results N84-13604
The effects of environment and dwell on high temperature fatigue crack growth of 2 1/4 Cr - 1 Mo steel
[AD-A132147] N84-13617
Effects of a finite aperture on the inverse born approximation
[DE83-018086] N84-13930
CRACKING (FRACTURING)
The mechanics of delamination in fiber-reinforced composite materials. Part 1: Stress singularities and solution structure
[NASA-CR-172269] N84-13221
The mechanics of delamination in fiber-reinforced composite materials. Part 2: Delamination behavior and fracture mechanics parameters
[NASA-CR-172270] N84-13222
Fiber composite materials research in the UK: Assessment report
[AD-A132386] N84-13226
Fracto-emission from polymers
[AD-A132462] N84-13314
Penetrant and magnetic-particle inspection for material integrity
[DE83-017830] N84-13600
Detection of closed internal fatigue cracks
[DE83-017686] N84-13620
CRACKS
Reverse combustion along constant geometry fissures in heterogeneous fuels N84-13232
Detection of cracks on highway pavements
[PB83-238204] N84-13389
Petrographic examination of Bell Canyon Tests (BCT) 1-FF field grouts over a 3-year period
[DE83-018226] N84-13654
CRASHWORTHINESS
Crash Position Indicator/Crash Survivable Flight Data Recorder ejectable versus nonejectable
[AD-A132329] N84-13184
CRATERS
Impact cratering and spall failure at gabbro
[NASA-CR-174618] N84-13704
CREEP PROPERTIES
Creep fatigue of low-cobalt superalloys: Waspalloy, PM U 700 and wrought U 700
[NASA-CR-168260] N84-13265
Effect of implanted helium on the microstructure and creep properties of ordered (Fe0.49 Ni0.51)V-3 alloys
[DE84-000691] N84-13278
Computational models for cyclic plasticity, rate dependence and creep in finite element analysis
[PB83-245829] N84-13308
CRITICAL TEMPERATURE
Is it superconductivity at 293 k?
[AD-A132545] N84-14037
CROP GROWTH
Respiration of roots response to low O2 stress
[DE83-017495] N84-13766
CROSSLINKING
Plasma polymerized high energy density dielectric films for capacitors
[NASA-CR-168233] N84-13310
CRUISING FLIGHT
Range and endurance of jet-engined airplanes at constant altitude
[REPT-83-A1-SER-A] N84-13175
CRYOGENIC COOLING
Control and operation cost optimization of the HISS cryogenic system
[DE83-017741] N84-13384
CRYOGENIC WIND TUNNELS
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-2, 207/March-April 1982
[ESA-TT-759] N84-13143
Aerodynamic force measurements with a train-gage balance in a cryogenic wind tunnel
[NASA-TP-2251] N84-13162
CRYOGENICS
Combined cold compressor/ejector helium-refrigerator cycle
[DE83-017764] N84-13385
Fermilab satellite refrigerator compressors with the oil- and moisture-removal systems
[DE83-017328] N84-13386
Cryogenic testing of the TPC superconducting solenoid
[DE84-000528] N84-13467
Heat transfer to subcooled HE 1
[DE83-017767] N84-13520
Forced two-phase cooling of the TPC superconducting solenoid
[DE83-017749] N84-14049
CRYPTOGRAPHY
VLSI architectures for computing multiplications and inverses in GF(2-m) N84-13406
CRYSTAL DEFECTS
Effects of compensation on light-induced metastable defects in aSi:H
[DE83-016696] N84-13680
Fourth Europhysical Conference on Lattice Defects in Ionic Crystals
[AD-A132387] N84-14039
Solid-State Division
[DE84-000296] N84-14045
Radiation damage in silicon detectors
[DE84-001460] N84-14056
CRYSTAL GROWTH
The role of the tetrapropylammonium template in the synthesis of zeolite ZSM-5
[CSIR-CENG-413] N84-13236
Preparation of infrared optic fibers using new materials
[AD-A132311] N84-13988
CRYSTAL LATTICES
The relationship between the martensitic phase transition and the superconducting properties of A15 compounds
[DE83-018186] N84-13477
Fourth Europhysical Conference on Lattice Defects in Ionic Crystals
[AD-A132387] N84-14039
CRYSTAL STRUCTURE
X-ray and backscattering analysis of ion implantation phenomena in GaAs and related compounds
[AD-A132429] N84-14038
Study of defects produced in tungsten by 800-MeV protons using field-ion microscopy
[DE84-001359] N84-14048
Revision of the statistical mechanics of phonons to include phonon line widths
[DE83-017229] N84-14051
CRYSTALLIZATION
Predicting the base phase in the crystallization of eutectic alloys
[BLL-M-35347-(5828.4)] N84-13262
CRYSTALS
Simulation of shock-induced energy flux in molecular solids
[DE84-001157] N84-14047
CURING
Processing science for AS/3501-6 carbon/epoxy composites
[AD-A132323] N84-13316
Finite-element analysis of an epoxy-curing process
[DE84-000452] N84-13323
CURRENT DENSITY
Development of multicomponent transport theory and transport data for membranes in concentrated electrolytes
[DE84-001846] N84-13249
Electrical and thermal modeling of railguns
[DE84-001361] N84-13387
CURRENT DISTRIBUTION
A programmable controller with overcurrent latch for constant primary peak current in capacitor-charging FET switcher for Nova
[DE83-018184] N84-13569
CURVE FITTING
Curve fit technique for a smooth curve using Gaussian sections
[AD-A132499] N84-13893
CYANIDES
Physiological function of combustion gas and especially that of CN N84-13378
CYCLIC HYDROCARBONS
Fates and biological effects of polycyclic aromatic hydrocarbons in aquatic systems
[PB83-250191] N84-13698
CYCLIC LOADS
Optimization of structures subjected to periodic loads N84-13605
CYCLOGENESIS
Quasi-Lagrangian diagnostics applied to an extratropical explosive cyclogenesis in the North Pacific
[AD-A132213] N84-13741
CYCLOHEXANE
Diffusion and sorption of cyclohexane vapor in SBS and SBR copolymers
[AD-A132397] N84-13315
CYCLONES
Precipitation development in midlatitude cyclones: A study of cloud structures and processes N84-13728
Quasi-Lagrangian diagnostics applied to an extratropical explosive cyclogenesis in the North Pacific
[AD-A132213] N84-13741
CYCLOTRON RADIATION
Electron-cyclotron maser and whistler instabilities in a relativistic electron plasma with loss-cone distribution
[DE84-001607] N84-13561
CYCLOTRON RESONANCE
Positive ion-molecule reactions in OCS/hydrocarbon mixtures
[AD-A132350] N84-13237
Calculation of ion charge-state distribution in ECR ion sources
[DE84-000517] N84-13957
CYCLOTRONS
Acceleration of heavy ions in the AGS and CBA
[DE83-017762] N84-13963
CYLINDRICAL BODIES
An analysis of smooth and axially finned, rotating heat pipe condensers
[AD-A132141] N84-13509

CYTOCHROMES
Kinetic and spectroscopic studies of cytochrome b-563 in isolated cytochrome b/f complex and in thylakoid membranes
[DE83-017982] N84-13760
CYTOLOGY
Approach to single-molecule detection by laser-induced fluorescence
[DE84-001338] N84-13572

D

DAMAGE ASSESSMENT
Probabilistic fatigue life predictions of structural components in high-cycle fatigue regimes
[AD-A132425] N84-13615
Natural hazards photograph catalog, key to geophysical records documentation no. 20
[PB83-250415] N84-13674
DAMPING
Perturbation methods for slightly damped gyroscopic systems N84-13534
Initial estimates of damping rates and frequencies
[ARL-STRUC-NOTE-485] N84-13879
DATA ACQUISITION
Fiber composite materials research in the UK: Assessment report
[AD-A132386] N84-13226
The computer fire codes and required new data N84-13369
The Telecommunications and Data Acquisition Report
[NASA-CR-174610] N84-13401
Polynomial driven time base and PN generator N84-13409
NOVANET: Communications network for a control system
[DE83-013862] N84-13436
Data validation and summary for the NRL remote sensing experiment: Phelps Bank, July, 1982. Part 2: Meteorology
[AD-A132105] N84-13646
Satellite activities of NOAA (National Environmental Satellite Data and Information Service) 1982
[PB83-252510] N84-13747
NRIO microcomputer system
[CSIR-T/SEA-8134] N84-13805
Neutron total cross section measurements in the energy region from 47 keV to 20 MeV
[DE84-001400] N84-13970
Fast, self-nulling spectroscopic ellipsometer: Instrumentation and application, revision
[DE83-015531] N84-13994
DATA BASE MANAGEMENT SYSTEMS
Triservice program for extending missile aerodynamic data base and prediction program using rational modeling
[AD-A132455] N84-13166
Benchmarking the join operations of relational database machines
[AD-A132312] N84-13861
Network file-storage system
[DE84-001068] N84-13863
Concurrency control for resilient nested transactions
[AD-A132501] N84-13891
Knowledge base management for model management systems
[AD-A132211] N84-14062
Tools for the creation of IMS database designs from Entity-Relationship diagrams
[DE84-000592] N84-14066
Standard format for data films --- synchrotron radiation sources
[DE84-000345] N84-14068
Management and display of data analysis environments for large data sets
[DE84-001414] N84-14069
DATA BASES
Triservice program for extending missile aerodynamic data base and prediction program using rational modeling
[AD-A132455] N84-13166
Experimental aerodynamic characteristics of missiles with square cross sections
[AD-A132278] N84-13215
Flat-plate solar-collector performance data base and user's manual
[DE83-011993] N84-13682
Specification and interpretation of data model semantics: An integration of two approaches
[PB83-249714] N84-13856
Detailed introduction and reference manual for: The network-shared-memory distributed database system
[DE83-017547] N84-13865
An interdisciplinary oceanographic database
[CSIR-T/SEA-8207] N84-14064
DATA LINKS
Airborne Intelligent Display (AID) phase 1 software development
[ATC-123] N84-13181
Asymptotic optimality of shortest path routing
[AD-A132280] N84-13423
DATA PROCESSING
Triservice program for extending missile aerodynamic data base and prediction program using rational modeling
[AD-A132455] N84-13166
Design issues in the GCF Mark 4 development N84-13415
Analysis of lead-acid battery accelerated testing data
[DE83-017403] N84-13473
Coordinate-measuring machine capability
[DE84-002014] N84-13544
Automated standard nautical chart production
[AD-A132249] N84-13644
Real-time processing system for the NRL (Naval Research Laboratory) remote sensing experiment: Phelps Bank, July 1982
[AD-A132151] N84-13645
Assessment of quality of data on tapes from the hydrogeochemical and stream sediment reconnaissance
[DE83-017897] N84-13647
Code BETAL to calculation Alpha/Beta activities in environmental samples
[JEN-549] N84-13816
DATA RETRIEVAL
CEREAS: An interactive computer-mapping system for environmental assessments
[DE83-017927] N84-13864
DATA SIMULATION
Specification and interpretation of data model semantics: An integration of two approaches
[PB83-249714] N84-13856
DATA SMOOTHING
Adaptive spectral smoothing
[AD-A132574] N84-13887
DATA TRANSMISSION
The FASTBUS segment driver microcode description
[DE83-017972] N84-13437
DEACTIVATION
Determination of a jet fuel metal deactivator by high performance liquid chromatography
[AD-A132220] N84-13336
DECAY RATES
Proceedings of the Summer Workshop on Proton Decay Experiments
[DE83-009572] N84-13980
DECISION MAKING
Building systems and smoke control N84-13348
Slippery versus slip resistant work surfaces: The background for a regulatory definition
[PB83-243634] N84-13392
Decision making and information processing under various uncertainty conditions
[AD-A132051] N84-13770
External versus intuitive reasoning: The conjunction fallacy in probability judgment
[AD-A131801] N84-13778
Model Statement Language/analyzer (MSL/MSA): A top-down Problem Statement Language/analyzer (PSL/PSA) approach for the user dialogue in decision support systems
[AD-A132273] N84-13829
Interacting weights in multiple attribute decision making
[CSIR-TWISK-270] N84-13874
PLY: A system of plausibility inference with a probabilistic basis
[AD-A132537] N84-13889
Knowledge base management for model management systems
[AD-A132211] N84-14062
DECISION THEORY
Various solutions in multiple Bayesian's decision and multinormal estimation problems
[TR-78] N84-13882
DECODING
White light signal processing with the application to spread spectrum communications
[AD-A132418] N84-13417
DECOMPOSITION
Matrix approach to testing mirrors, part 2
[DE83-011996] N84-13676
DECOMPRESSION SICKNESS
Decompression procedures for flying after diving, and diving at altitudes above sea level
[AD-A132039] N84-13771
DEEP SPACE INSTRUMENTATION FACILITY
Energy consumption analysis of the Venus Deep Space Station (DSS-13) N84-13413
DEEP SPACE NETWORK
Orbit determination of highly elliptical Earth orbiters using VLBI and delta VLBI measurements N84-13402
Intercontinental time and frequency transfer using a global positioning system timing receiver N84-13411
Energy consumption analysis of the Venus Deep Space Station (DSS-13) N84-13413
A study of the charged particle calibration requirements for the Deep Space Network N84-13414
Design issues in the GCF Mark 4 development N84-13415
DEFECTS
Sizing defects using annular-array techniques with an automated ultrasonic data-acquisition system
[DE84-001644] N84-13597
Penetrant and magnetic-particle inspection for material integrity
[DE83-017830] N84-13600
Study of defects produced in tungsten by 800-MeV protons using field-ion microscopy
[DE84-001359] N84-14048
DEFORESTATION
Deforestation measured by LANDSAT: Steps toward a method
[DE83-016645] N84-13652
DEFORMATION
Generalized plastic hinge concepts for 3D beam-column elements
[PB83-247981] N84-13391
Modelling the behavior of materials
[DE84-000154] N84-13588
Welding deformations and residual stresses due to circumferential welding of cylindrical shells and hemispherical end plates
[DRIC-T-6868] N84-13602
Precision support of annular optics
[DE83-017473] N84-13993
DEGRADATION
Fiber composite materials research in the UK: Assessment report
[AD-A132386] N84-13226
Grain boundary segregation and environmental degradation of a ferritic stainless steel
[DE83-016927] N84-13289
Storage of synthetic turbine lubricants under adverse conditions
[AD-A132226] N84-13319
Middle distillate fuel stability characteristics: A review
[AD-A132156] N84-13337
Matrix approach to testing mirrors, part 2
[DE83-011996] N84-13676
DEGREES OF FREEDOM
Nulling with limited degrees of freedom
[AD-A132276] N84-13424
An experimental study of multi-link models of human postural dynamics and control N84-13769
DEHUMIDIFICATION
Oak Ridge heat-pump models. Part 1. A steady-state computer design model for air-to-air heat pumps
[DE84-001577] N84-13519
DEICING
Numerical simulation of two-dimensional heat transfer in composite bodies with application to de-icing of aircraft components
[NASA-CR-168283] N84-13490
DELAMINATING
The mechanics of delamination in fiber-reinforced composite materials. Part 1: Stress singularities and solution structure
[NASA-CR-172269] N84-13221
The mechanics of delamination in fiber-reinforced composite materials. Part 2: Delamination behavior and fracture mechanics parameters
[NASA-CR-172270] N84-13222
DELTA WINGS
Vortex flap flow reattachment line and subsonic longitudinal aerodynamic data on 50 deg to 74 deg Delta wings on common fuselage
[NASA-TM-84618] N84-13160
DENSITY MEASUREMENT
Atomic-beam density determination from laser-induced fluorescence interval distributions
[DE84-000677] N84-13571
The amplitude density function and high-resolution frequency analysis of time series
[AD-A132466] N84-13906
DEPOSITION
Survey of water quality and flow in Maryland coastal zone streams: A data report
[PB83-249375] N84-13660
Fate and effects of metals in the sea-surface microlayer
[DE84-000114] N84-13752
Fast, self-nulling spectroscopic ellipsometer: Instrumentation and application, revision
[DE83-015531] N84-13994

Eclipse mapping of accretion disks in cataclysmic binaries N84-14080
DEPOSITS
Solubility of the NiO fuel-cell cathode in Li2CO3 melts as determined by cyclic voltammetry [DE83-014311] N84-13485
DEPTH
Interactive surface visualization using raster graphics [AD-A132548] N84-13819
DESERTS
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system [E84-10050] N84-13643
DESIGN ANALYSIS
Airborne Intelligent Display (AID) phase 1 software development [ATC-123] N84-13181
A rectangular gate merged MOSBJT [AD-A132450] N84-13453
Research, development and demonstration of lead-acid batteries for electric vehicle propulsion [DE84-000468] N84-13464
Optimization of structures subjected to periodic loads N84-13605
Spectroradiometric calibration of the thematic mapper and multispectral scanner system [E84-10045] N84-13638
Design analysis of advanced photovoltaic technologies [DE84-000008] N84-13675
The design and implementation of debugging systems for languages with advanced control structures N84-13811
DESTABILIZATION
Interaction of a stream of dielectric spheres in an electric field in a high vacuum [DE83-013695] N84-13958
DETECTION
Detection of closed internal fatigue cracks [DE83-017686] N84-13620
DETECTORS
Detectors for optical communications: A review N84-13404
DETONATION WAVES
Theoretical modeling of converging and diverging detonation waves in solid and gaseous explosives [DE83-017300] N84-13528
DEUTERIUM
A laser-fusion rocket for interplanetary propulsion [DE84-001236] N84-13219
d-d Tokamak reactor assessment [DE83-016127] N84-14019
DEUTERONS
Dislocation/obstacle interactions during low-dose irradiation creep of nickel [DE84-001416] N84-13303
DEW POINT
Humidity measurement comparison tests: Dew point hygrometer versus wet bulb psychrometer [PB83-237487] N84-13546
DEXTRANS
Improved polymers for enhanced-oil-recovery synthesis and rheology [DE83-017371] N84-13324
DIAGRAMS
Hazardous location identification by computer [CSIR-TR-RF/6/81] N84-13814
DIAPHRAGMS (MECHANICS)
Optical methods of measuring loudspeaker diaphragm movement [BBC-RD-1983/13] N84-13396
DIELECTRIC PROPERTIES
External wave-launcher study [DE84-001124] N84-13441
The effect of water on the dielectric performance of a cable [BLL-OA-TRANS-2634-(6196.3)] N84-13447
DIELECTRICS
Interaction of a stream of dielectric spheres in an electric field in a high vacuum [DE83-013695] N84-13958
DIESEL ENGINES
Alternative fuels for medium-speed diesel engines (AFFMSDE) program: Slurries, emulsions, and blended-fuel extenders; cylinder wear measurements, staged injection [DE84-000524] N84-13340
Residual shale-oil/diesel-engine operating compatibility program [DE84-000133] N84-13587
DIESEL FUELS
Middle distillate fuel stability characteristics: A review [AD-A132156] N84-13337
Alternative fuels for medium-speed diesel engines (AFFMSDE) program: Slurries, emulsions, and blended-fuel extenders; cylinder wear measurements, staged injection [DE84-000524] N84-13340
DIETS
Adaptations to a high fat diet which increase exercise endurance in male rats N84-13755
DIFFERENTIAL EQUATIONS
Method of operator splitting or fractional steps and its applications to fluid-dynamic modelling [DE84-000800] N84-13511
Inertial effects in laser-drive ablation [DE84-000071] N84-13566
The specific solutions of a uniform algebraic differential equation of the second order [ISSN-0066-1953] N84-13783
The specific solutions of a uniform algebraic differential equation of the second order N84-13790
Quasiconformal semiflows N84-13792
On interpolation methods for boundary value ordinary differential equations N84-13869
Solution of the 2-point boundary value problems of optimal spacecraft rotational maneuvers N84-13870
Remarks on the Kuramoto-Sivashinsky equation [DE84-001018] N84-13901
DIFFERENTIAL GEOMETRY
Bifurcation theory applied to the study of control losses on combat aircraft N84-13144
On L sup p-integrability in PDE's and quasiregular mappings for large exponents N84-13799
DIFFERENTIAL THERMAL ANALYSIS
Characterization of the structure and substructure of thermally transformation cycled Cu-Zn-Al shape memory alloys [AD-A132341] N84-13270
DIFFRACTION
Further investigations of the multiple knife-edge attenuation function [PB83-245043] N84-13442
DIFFUSION
Diffusivities of hydrogen in yttrium and yttrium alloys [DE84-000411] N84-13296
Diffusion and sorption of cyclohexane vapor in SBS and SBR copolymers [AD-A132397] N84-13315
Update of pulsed-laser processing technology for high-efficiency silicon solar cells [DE84-000638] N84-13684
Atmospheric dispersion of ammonia: An ammonia fog model [DE84-000165] N84-13689
Study on diffusion of the vertical magnetic field in the toroidal stabilizing shell of the ZT-40M reversed-field-pinch device [DE83-016353] N84-14023
Effects of simultaneous phosphorus and arsenic diffusions on emitter push and dislocation generation [AD-A132331] N84-14042
DIFFUSION FLAMES
Similarity analysis of the flow characteristics in diffusion flames N84-13367
DIGITAL FILTERS
Automated design of microprocessor-based digital filters [AD-A132214] N84-13832
DIGITAL RADAR SYSTEMS
A compact optical pulse compressor with computer-generated holographic masks for radar applications [AD-A132152] N84-13430
DIGITAL SYSTEMS
Standard NIM digital bus (NIM/GPIE) [DE83-017865] N84-13435
Digital instrumentation package or an improved torsion pendulum [PB83-240424] N84-13547
DIGITAL TECHNIQUES
Digital instrumentation package or an improved torsion pendulum [PB83-240424] N84-13547
DIGITAL TELEVISION
Study of potential standardization of video teleconferencing systems. Volume 2: Appendices [AD-A132081] N84-13431
Study of potential standardization of video teleconferencing systems, volume 1 [AD-A132080] N84-13432
DIGITAL TO ANALOG CONVERTERS
Processor-controlled DAC-20 (digital-to-analog converter) [AD-A132260] N84-13460
DIGITS
Cognitive components underlying the digit symbol test [PB83-250464] N84-13779
DIODES
Pulsed-power diode generation of high-power microwaves [DE84-001344] N84-13440
Decoupling ion efficiency from impedance in pulsed power diodes [DE83-018114] N84-13470
Proto-I axial-focusing experiments [DE84-000458] N84-13951
IBEX: Annular beam propagation experiment [DE84-000456] N84-13954
Analysis of mechanisms for anode plasma formation in ion diodes [DE83-017793] N84-14010
Overview of ion-diode research [DE83-017791] N84-14012
Hybrid ion diode theory and computations [DE84-000102] N84-14029
DISASTERS
Natural hazards photograph catalog, key to geophysical records documentation no. 20 [PB83-250415] N84-13674
DISCONTINUITY
Pseudospectral solution of inviscid flows with multiple discontinuities [AD-A132084] N84-13510
DISCRETE FUNCTIONS
Application of pseudoinversion to linear system identification with discrete measurements [AD-A132283] N84-13422
DISKS (SHAPES)
Functions of uniformly bounded characteristic N84-13802
DISLOCATIONS (MATERIALS)
Dislocation/obstacle interactions during low-dose irradiation creep of nickel [DE84-001416] N84-13303
Modelling the behavior of materials [DE84-000154] N84-13588
DISPLACEMENT
Coordinate-measuring machine capability [DE84-002014] N84-13544
DISPLACEMENT MEASUREMENT
Description of a method and artifact for estimating volumetric uncertainty of coordinate measuring machines [DE84-002017] N84-13545
Three-dimensional analysis of chevron-notched specimens by boundary integral method [NASA-CR-172225] N84-13607
DISPLAY DEVICES
Airborne Intelligent Display (AID) phase 1 software development [ATC-123] N84-13181
Simulator study of pilot-aircraft-display system response obtained with a three-dimensional-box pictorial display [NASA-TP-2122] N84-13182
An airborne color video insetter [AD-A132183] N84-13185
Interactive surface visualization using raster graphics [AD-A132548] N84-13819
Computer-based ultrasonic multiple-frequency pulse-echo test system [AD-A132227] N84-13926
DISSOCIATION
Dissociative ionization of liquid water induced by vibrational overtone excitation [DE83-017739] N84-13251
Resonance-resonance coupling in dissociative electron attachment [DE84-001767] N84-13972
DISSOLVED GASES
Physical modeling of the champagne effect [DE84-001813] N84-13388
DISTRIBUTED PARAMETER SYSTEMS
Analysis and control of quasi distributed parameter systems N84-13603
File migration in distributed computer systems N84-13860
DISTRIBUTED PROCESSING
A technical overview of the National Software Works [AD-A132320] N84-13827
DISTRIBUTION
Numerical modeling of the MOSBJT [AD-A132351] N84-13456
DIVERGENCE
Finite elements and the divergence constraint for viscous flows N84-13486
DIVERTERS
An analysis of the interaction between a submerged jet and a receiver-diffuser in a reverse-flow diverter [DE83-012593] N84-13521
Plasma/neutral gas transport in divertors and limiters [DE84-001594] N84-14034

DIVING (UNDERWATER)
Decompression procedures for flying after diving, and diving at altitudes above sea level
[AD-A132039] N84-13771
DOCUMENTS
Annotated bibliography of battery evaluations
[DE84-000653] N84-13466
DOLOMITE (MINERAL)
Stress-wave experiments on selected crustal rocks and minerals
[DE84-001613] N84-13714
Geology of carbonate aggregate resources of Illinois, Illinois mineral notes
[PB83-251140] N84-13725
DOPED CRYSTALS
Development and fabrication of a high current, fast recovery power diode
[NASA-CR-168196] N84-13443
DOPPLER NAVIGATION
Orbit determination of highly elliptical Earth orbiters using VLBI and delta VLBI measurements N84-13402
DOSAGE
Aerial radiological survey of Area 11, Nevada Test Site
[DE84-000440] N84-13650
DOSIMETERS
Recommended values of the humidity correction factor k sub h for determining exposure in an X-ray beam with free-air chambers
[JEN-542] N84-13915
DOUBLE BASE PROPELLANTS
A comment on the plateau combustion mechanism of the double-base propellants
[AD-A132551] N84-13333
DRAINAGE
SRL tethersonde and echosonde data, Anderson Creek Valley, California
[DE84-001680] N84-13715
DRIFT RATE
Evidence for a hot electron flux limit in laser-produced plasma experiments
[DE84-001365] N84-13555
Studies of ions in a drift field: Laser diagnostics of excited states and measurements of thermochemical properties at equilibrium
[DE84-000363] N84-13562
DROPS (LIQUIDS)
Quantum-mechanical calculations of the properties of liquid He droplets
[DE84-000164] N84-13220
DUCTILITY
Segregation and domain structure in rapidly solidified Ni3Al
[DE83-017188] N84-13306
Minaturized disk bend tests of neutron-irradiated path A type alloys
[DE84-001277] N84-13618
DWELL
The effects of environment and dwell on high temperature fatigue crack growth of 2 1/4 Cr - 1 Mo steel
[AD-A132147] N84-13617
DYE LASERS
Narrow-band, near-UV, high-repetition-rate laser-induced fluorescence system for use as an dge diagnostic in fusion machine
[DE84-000586] N84-13567
DYES
Dynamic aspects of the dye-sensitized photoconductivity of semiconductors
[DE84-001132] N84-14059
DYNAMIC CHARACTERISTICS
Theoretical studies of oxygen-iodine laser mechanisms and new laser concepts
[AD-A132374] N84-13550
DYNAMIC MODELS
Recent Japanese progress in fire modeling N84-13353
Recent US progress in fire growth modeling N84-13354
DYNAMIC RESPONSE
Flight test and analyses of the B-1 structural mode control system at supersonic flight conditions
[NASA-CR-170405] N84-13197
DYNAMIC STRUCTURAL ANALYSIS
Blade loss transient dynamics analysis with flexible bladed disk
[NASA-CR-168176] N84-13193
Analysis and control of quasi distributed parameter systems N84-13603
The emergence and propagation of a phase boundary in an elastic bar
[AD-A132275] N84-13616

E

EARLY STARS
A study of the empirical mass-luminosity diagram for early type stars N84-14075
EARTH (PLANET)
An analysis of acoustic and seismic wave resonances N84-13701
EARTH ATMOSPHERE
Propagation of a radio-frequency pulsed signal over the Earth. The JOLLY programs
[DE84-000109] N84-13439
Surface heat flux derived from sodar amplitude and frequency data: A comparison
[DE83-017930] N84-13717
EARTH MANTLE
Postglacial rebound observed by Lageos and the effective viscosity of the lower mantle
[NASA-TM-84982] N84-13705
EARTH ORBITS
A position paper: Mesoscale oceanography from GEOSAT
[AD-A132292] N84-13749
EARTH SATELLITES
Simulation and analysis of low altitude terrestrial satellites
[INPE-2754-PRE/330] N84-13209
EARTHQUAKE DAMAGE
Natural hazards photograph catalog, key to geophysical records documentation no. 20
[PB83-250415] N84-13674
EARTHQUAKE RESISTANT STRUCTURES
Lateral-torsional response of structures subjected to seismic waves
[PB83-239582] N84-13390
Earthquake response considerations of broad liquid storage tanks
[PB83-251215] N84-13393
EARTHQUAKES
Microseismic monitoring for evidence of geothermal heat in the capital district of New York
[PB83-248807] N84-13659
ECCENTRICITY
Lateral-torsional response of structures subjected to seismic waves
[PB83-239582] N84-13390
ECHOES
Computer-based ultrasonic multiple-frequency pulse-echo test system
[AD-A132227] N84-13926
ECLIPSING BINARY STARS
Eclipse mapping of accretion disks in cataclysmic binaries N84-14080
ECOLOGY
Survey of water quality and flow in Maryland coastal zone streams: A data report
[PB83-249375] N84-13660
Life histories and monitoring strategies: Some lessons from field experience
[DE83-016164] N84-13763
ECONOMIC ANALYSIS
Programmer's manual for the fire safety evaluation system cost minimizer computer program
[PB83-251447] N84-13395
Evaluating proposed improvements of public rangelands
[PB83-251124] N84-13669
Economic benefits of operational environmental satellites
[PB83-252932] N84-13748
The linear hierarchical model and its application in the econometric analysis
[CSIR-TWISK-274] N84-13875
Deregulating the airlines: An economic analysis
[PB83-250019] N84-14070
ECOSYSTEMS
Impact of enhanced solar UV-B radiation upon the marine ecosystem
[PB83-247411] N84-13694
Fates and biological effects of polycyclic aromatic hydrocarbons in aquatic systems
[PB83-250191] N84-13698
EDDY CURRENTS
Relationships between strength, electrical conductivity, and density for oxidized PGX graphite
[DE83-016184] N84-13325
EDDY VISCOSITY
A fully vectorized numerical solution of the incompressible Navier-Stokes equations
[NASA-CR-174496] N84-13491
EDGES
The propagation and arrest of an edge crack in an elastic half-space under conditions of anti-plane shear: Analytical and numerical results N84-13604
EFFICIENCY
Control and operation cost optimization of the HISS cryogenic system
[DE83-017741] N84-13384
RF performance of a proposed L-band antenna system N84-13410
Evidence for a hot electron flux limit in laser-produced plasma experiments
[DE84-001365] N84-13555
Inertial effects in laser-drive ablation
[DE84-000071] N84-13566
Design and evaluation of small water turbines
[DE84-000404] N84-13586
EFFLUENTS
A guide for effluent radiological measurements at DOE installations
[DE83-016639] N84-13542
EGGS
Fate and effects of metals in the sea-surface microlayer
[DE84-000114] N84-13752
EIGENVALUES
Complex eigenvalues for the stability of Couette flow
[NASA-CR-172251] N84-13492
Quasicon formal extensions, Fredholm eigenvalues, and Grunsky coefficient conditions N84-13804
Estimation of the Manova eigenvalues under the random effects model
[CSIR-TWISK-271] N84-13877
ELASTIC BARS
The emergence and propagation of a phase boundary in an elastic bar
[AD-A132275] N84-13616
ELASTIC BODIES
The propagation and arrest of an edge crack in an elastic half-space under conditions of anti-plane shear: Analytical and numerical results N84-13604
Restricted maximum principles for elastic bodies
[NASA-CR-172255] N84-13609
The plane stress/strain analysis of non-homogeneous continua by the boundary integral equation method
[TR-821S] N84-13880
ELASTIC DEFORMATION
Non-uniformity of elastic micro-deformations in austenitic steels
[BLL-M-35357-(5828.4)] N84-13261
ELASTIC MEDIA
The dynamic in plane response at the centre of a rotating elastic disc due to oscillatory in plane forces at the rim
[ISVR-TR-121] N84-13613
ELASTIC PROPERTIES
Comparison of compression properties and swelling of beryllium irradiated at various temperatures
[DE84-000597] N84-13277
Targeted basic studies of ferroelectric and ferroelastic materials for piezoelectric transducer applications
[AD-A132136] N84-13461
The measurement of elastic constants for the determination of stresses by X-rays
[AD-A132330] N84-13897
Precision support of annular optics
[DE83-017473] N84-13993
ELASTIC SCATTERING
Raman and fluorescent scattering by molecules embedded in small particles
[DE84-001278] N84-13937
Recent developments in the understanding of pion-nucleus scattering
[DE84-001017] N84-13942
ELASTIC SYSTEMS
On the effect of gyroscopic forces on the instability of certain fluid-elastic systems. Part 1: Definitions
[PUBL-340] N84-13499
ELASTIC WAVES
Elastic-wave scattering from multiple voids (porosity)
[DE83-018076] N84-13598
ELASTOMERS
Fracto-emission from polymers
[AD-A132462] N84-13314
ELECTRIC AUTOMOBILES
Baseline and verification tests of the electric vehicle associates' current fare station wagon
[AD-A132549] N84-14072
ELECTRIC BATTERIES
Battery transport data
[DE84-001640] N84-13462
Annotated bibliography of battery evaluations
[DE84-000653] N84-13466
Principles of superionic conduction
[DE84-001215] N84-14044
ELECTRIC BRIDGES
An FET full-bridge switcher for inductorless capacitor charging for Nova
[DE83-018005] N84-13471

ELECTRIC CONDUCTORS
MM and T: Ceramic metal substrates for hybrid electronics
[AD-A132514] N84-13313
ELECTRIC CONTACTS
A rectangular gate merged MOSBJT
[AD-A132450] N84-13453
Update of pulsed-laser processing technology for high-efficiency silicon solar cells
[DE84-000636] N84-13684
ELECTRIC CURRENT
Fields and currents and charges on obstacles in a parallel-plate simulator at selected frequencies and with pulse excitation
[AD-A132406] N84-13418
Variational theory of RF-driven currents
[DE83-016745] N84-14022
Loop coalescence in flares and coronal X-ray brightening
[DE83-013070] N84-14099
ELECTRIC DISCHARGES
Update of pulsed-laser processing technology for high-efficiency silicon solar cells
[DE84-000636] N84-13684
ELECTRIC FIELDS
Studies of ions in a drift field: Laser diagnostics of excited states and measurements of thermochemical properties at equilibrium
[DE84-000363] N84-13562
Interaction of a stream of dielectric spheres in an electric field in a high vacuum
[DE83-013695] N84-13958
Electrical and magnetic properties of the energy-saver correction elements
[DE83-017327] N84-13983
Locally omnigenous tandem-mirror design
[DE84-001605] N84-14007
ELECTRIC GENERATORS
MOD-2 wind turbine development
[NASA-TM-83460] N84-13670
ELECTRIC MOTOR VEHICLES
Research, development and demonstration of lead-acid batteries for electric vehicle propulsion
[DE84-000468] N84-13464
Study and review of permanent magnets for electric vehicle propulsion motors
[NASA-CR-168178] N84-14071
ELECTRIC NETWORKS
Superregenerative amplifier in linear mode as a radar range gate-derivations
[DE84-000978] N84-13474
ELECTRIC POTENTIAL
Service experience of EDF 20 kV XLPe insulated cable
[BLL-OA-TRANS-2633-(6196.3)] N84-13448
ELECTRIC POWER TRANSMISSION
China builds first 6000kV type pulse voltage generator
[AD-A132564] N84-13449
ELECTRIC PROPULSION
Research, development and demonstration of lead-acid batteries for electric vehicle propulsion
[DE84-000468] N84-13464
ELECTRICAL INSULATION
The effect of water on the dielectric performance of a cable
[BLL-OA-TRANS-2634-(6196.3)] N84-13447
Service experience of EDF 20 kV XLPe insulated cable
[BLL-OA-TRANS-2633-(6196.3)] N84-13448
Void-free epoxy castings for cryogenic insulators and seals
[DE83-017273] N84-13479
Radial thermomechanical behaviour
[BLL-OA-TRANS-2639-(6196.3)] N84-13503
Analysis of mechanisms for anode plasma formation in ion diodes
[DE83-017793] N84-14010
ELECTRICAL MEASUREMENT
Solubility of the NiO fuel-cell cathode in Li2CO3 melts as determined by cyclic voltammetry
[DE83-014311] N84-13485
Overview of ion-diode research
[DE83-017791] N84-14012
ELECTRICAL RESISTIVITY
Superconducting niobium thin film slow-wave structures N84-13405
ELECTRO-OPTICS
Effect of silane fraction on the optoelectronic and photovoltaic properties of RF-glow-discharge a-Si:H prepared from SiH4 + H2 mixtures
[DE83-016730] N84-14058
ELECTROCHEMICAL CELLS
Safety studies on Li/SOCl-2 reserve battery
[AD-A132279] N84-13458
ELECTROCHEMICAL CORROSION
Galvanic coupling between D6AC steel, 6061-T6 aluminum, Inconel 718 and graphite-epoxy composite material: Corrosion occurrence and prevention
[NASA-TP-2236] N84-13263
Mathematical models of nonlinear galvanic polarization
[AD-A132403] N84-13895
ELECTROCHEMISTRY
Electrochemical etching of titanium-alloy castings
[DE84-000244] N84-13286
International Meeting on Lithium Batteries
[AD-A132371] N84-13455
ELECTRODEPOSITION
The electrodeposition of titanium coatings
[BLL-OA-TRANS-3057-(6196.3)] N84-13260
Investigation of the possibilities for the electrodeposition of titanium from non-aqueous solutions
[BLL-OA-TRANS-3069-(6196.3)] N84-13267
ELECTRODES
Application of surface-physics techniques to the study of electrochemical systems
[DE84-000957] N84-13245
Development of a circulating zinc-bromine battery, phase 2
[DE84-001886] N84-13463
ELECTROLYSIS
The effect of the structure of metallo-organic complexes on the electrolytic precipitation of titanium and niobium from nonaqueous electrolytes
[BLL-OA-TRANS-3070-(6196.3)] N84-13259
ELECTROLYTES
Electrolytic gettering of tritius from air
[DE84-000174] N84-13252
Development of a circulating zinc-bromine battery, phase 2
[DE84-001886] N84-13463
Solubility of the NiO fuel-cell cathode in Li2CO3 melts as determined by cyclic voltammetry
[DE83-014311] N84-13485
ELECTROLYTIC CELLS
Development of electrolysis-cell separator for 1250C operation. Advanced alkaline electrolysis cell development
[DE84-000439] N84-13484
ELECTROMAGNETIC ABSORPTION
Optical properties of the marine aerosol as predicted by a BASIC version of the Navy aerosol model
[AD-A132411] N84-13986
ELECTROMAGNETIC FIELDS
Microwave generators: Oscillating virtual cathodes and reflexing electrons
[DE84-001346] N84-13433
Motion of ionized electrons under the intense electromagnetic field of the beam
[DE84-001396] N84-13955
ELECTROMAGNETIC INTERACTIONS
Physics with polarized beams in e+e(-) colliders
[DE83-016441] N84-13976
ELECTROMAGNETIC NOISE
An analysis of pC-3 micropulsion in the geomagnetic field
[AD-A132443] N84-13709
ELECTROMAGNETIC PROPULSION
Shot to the moon from a cannon
[AD-A132554] N84-13216
ELECTROMAGNETIC PULSES
Fields and currents and charges on obstacles in a parallel-plate simulator at selected frequencies and with pulse excitation
[AD-A132406] N84-13418
ELECTROMAGNETIC RADIATION
Wave and particle observations associated with the beam plasma discharge in a space simulation chamber N84-13210
ELECTROMAGNETIC WAVE TRANSMISSION
Further investigations of the multiple knife-edge attenuation function
[PB83-245043] N84-13442
Optical properties of the marine aerosol as predicted by a BASIC version of the Navy aerosol model
[AD-A132411] N84-13986
ELECTRON ACCELERATORS
IBEX: Annular beam propagation experiment
[DE84-000456] N84-13954
Conceptual design of a 300-GeV accelerator based on the inverse free-electron laser mechanism
[DE84-001471] N84-13969
ELECTRON ATTACHMENT
Resonance-resonance coupling in dissociative electron attachment
[DE84-001767] N84-13972
Electron-drift velocity and ionization and attachment coefficients in gases/mixtures for diffuse-discharge opening switches
[DE83-017206] N84-14017
ELECTRON BEAMS
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-5, 210/September-October 1982
[ESA-TT-785] N84-13142
Wave and particle observations associated with the beam plasma discharge in a space simulation chamber N84-13210
Low-inductance, dual-feed diode development
[DE84-000117] N84-13465
Beam dynamics in the Advanced Test Accelerator (ATA)
[DE84-001421] N84-13947
Space-time evolution of the nonlinear 2-stream instability
[DE84-001336] N84-13950
IBEX: Annular beam propagation experiment
[DE84-000456] N84-13954
Scientific program and abstracts
[DE83-017620] N84-13967
Simulations of the effects of mobile ions on the relativistic beam-plasma instability for intense beams
[DE84-000369] N84-14003
ELECTRON BUNCHING
Grad-B drift transport of high current electron beams
[DE84-000115] N84-13977
ELECTRON CYCLOTRON HEATING
Electron-cyclotron maser and whistler instabilities in a relativistic electron plasma with loss-cone distribution
[DE84-001607] N84-13561
ELECTRON DENSITY (CONCENTRATION)
Evidence for a hot electron flux limit in laser-produced plasma experiments
[DE84-001365] N84-13555
Thomson-scattering measurements of electron temperature and density in a plasma channel created by a relativistic electron beam
[DE84-000356] N84-13940
ELECTRON DIFFRACTION
Application of surface-physics techniques to the study of electrochemical systems
[DE84-000957] N84-13245
ELECTRON ENERGY
Electron-energy-loss spectral library and its application to materials science
[DE84-000588] N84-13241
Thomson-scattering measurements of electron temperature and density in a plasma channel created by a relativistic electron beam
[DE84-000356] N84-13940
ELECTRON MICROSCOPY
Proceedings of the Seventh International Conference on High Voltage Electron Microscopy
[DE83-016323] N84-13540
ELECTRON SCATTERING
Predicting the base phase in the crystallization of eutectic alloys
[BLL-M-35347-(5828.4)] N84-13262
ELECTRON STATES
Photo-induced field emissions from metallic surfaces
[DE84-000872] N84-13966
ELECTRON TUBES
Decoupling ion efficiency from impedance in pulsed power diodes
[DE83-018114] N84-13470
ELECTRONIC EQUIPMENT
Collapsible photovoltaic-concentrator array portable power from the Sun
[DE84-000713] N84-13677
ELECTRONIC MODULES
Standard NIM digital bus (NIM/GPIE)
[DE83-017865] N84-13435
ELECTRONIC PACKAGING
Wafer-scale integration of systolic arrays
[AD-A132536] N84-13450
ELECTRONIC SPECTRA
Electron-energy-loss spectral library and its application to materials science
[DE84-000588] N84-13241
ELECTRONS
Neutrino-oscillation experiments at Brookhaven National Laboratory
[DE83-018275] N84-13476
Physics with polarized beams in e+e(-) colliders
[DE83-016441] N84-13976
ELECTROPOLISHING
Characterization of alloy 600 surfaces after exposure to a caustic environment
[DE83-018297] N84-13300
ELECTROSTATIC CHARGE
ESD evaluation of radiation-hardened, high-reliability CMOS and MNOS ICs
[DE84-000138] N84-13481
ELECTROSTATIC PRECIPITATORS
Mathematical model of electrostatic precipitation for the Texas Instruments Programmable 59 calculator
[PB83-261669] N84-13695

ELECTROSTATIC WAVES
Wave and particle observations associated with the beam plasma discharge in a space simulation chamber
N84-13210
ELECTROSTRICTION
Targeted basic studies of ferroelectric and ferroelastic materials for piezoelectric transducer applications
[AD-A132136] N84-13461
ELEMENTARY PARTICLE INTERACTIONS
Revision of the statistical mechanics of phonons to include phonon line widths
[DE83-017229] N84-14051
ELEVATORS (CONTROL SURFACES)
Aircraft accident report - United Airlines Flight 2885, N8053U, McDonnell Douglas DC-8-54F, Detroit, Michigan, January 11, 1983
[PB83-910407] N84-13168
ELLIPSOMETERS
Fast, self-nulling spectroscopic ellipsometer: Instrumentation and application, revision
[DE83-015531] N84-13994
ELLIPTICAL POLARIZATION
An analysis of pC-3 micropulsion in the geomagnetic field
[AD-A132443] N84-13709
EMBEDDING
Planar embedding of planar graphs
[AD-A132538] N84-13820
EMERGENCIES
Human behavior N84-13352
A study on sound guidance for evacuation: Effect of megaphoned evacuation guidance in smoke
N84-13356
The MGM Grand Hotel fire: A case study of human reaction to fire N84-13358
Project People 2: An extended interview study of behavior response patterns in health care facility fire incidents N84-13359
Emergency evacuation flow models N84-13360
Escape and rescue model N84-13361
EMISSION
Fracto-emission from polymers
[AD-A132462] N84-13314
EMISSION SPECTRA
Characterization of high-temperature vapor-phase species and vapor-solid interactions of import to combustion and gasification processes in the energy technologies
[DE83-015166] N84-13242
Vibrational spectroscopy of chemisorbed molecules by infrared emission
[DE84-000956] N84-13973
Sounding rocket XUV observations of Capella
N84-14078
Studies of cataclysmic variables N84-14084
Extragalactic emission-line objects and the Michigan-Tololo survey N84-14101
Physics of the synchrotron model of cosmic gamma-ray bursts
[DE84-000917] N84-14104
EMITTERS
Effects of simultaneous phosphorus and arsenic diffusions on emitter push and dislocation generation
[AD-A132331] N84-14042
EMOTIONS
Stress assessment through voice analysis
[AD-A132577] N84-13773
ENCLOSURES
Modeling of compartment fires N84-13364
ENDOTHERMIC REACTIONS
Investigation of the dynamics and threshold behavior of endothermic negative ion-neutral reactions
[DE84-001369] N84-13975
ENERGY CONSERVATION
Annotated bibliography of battery evaluations
[DE84-000653] N84-13466
ENERGY CONSUMPTION
Energy consumption analysis of the Venus Deep Space Station (DSS-13) N84-13413
Energy-efficient automobiles for the future
[DE84-000600] N84-14073
ENERGY CONVERSION EFFICIENCY
Application features and considerations in advanced lead-acid and nickel/iron EV batteries
[DE83-017936] N84-13472
ENERGY DISSIPATION
Electron-energy-loss spectral library and its application to materials science
[DE84-000588] N84-13241
ENERGY LEVELS
Density of occupied d states in transition metal-metalloid metallic glasses
[DE84-001206] N84-13298
Neutron total cross section measurements in the energy region from 47 keV to 20 MeV
[DE84-001400] N84-13970
ENERGY POLICY
Baseline and verification tests of the electric vehicle associates' current fare station wagon
[AD-A132549] N84-14072
ENERGY SPECTRA
Direct measurement of the energy spectrum of an intense proton beam
[DE84-000457] N84-13939
Statistical properties of deep inelastic reactions
[DE84-000722] N84-13943
Loop coalescence in flares and coronal X-ray brightening
[DE83-013070] N84-14099
ENERGY STORAGE
Physical modeling of the champagne effect
[DE84-001813] N84-13388
Theoretical modeling of the plasma-erosion opening switch for inductive-storage applications
[DE84-001843] N84-13483
Flywheel rotor and containment technology development, FY83
[DE83-017615] N84-13589
ENERGY TECHNOLOGY
Photovoltaic-cell-reseach priorities
[DE84-000066] N84-13683
Ecological Research Division marine research program
[DE83-017880] N84-13691
Computer software summaries, numbers 424 through 693
[DE83-015297] N84-13834
New heavy-ion-fusion accelerator research program
[DE83-014898] N84-14016
ENERGY TRANSFER
Decoupling ion efficiency from impedance in pulsed power diodes
[DE83-018114] N84-13470
Theoretical studies of oxygen-iodine laser mechanisms and new laser concepts
[AD-A132374] N84-13550
Analysis of stability and symmetry implications for ICF
[DE84-000640] N84-13556
Shock induced molecular excitation in solids
[AD-A132236] N84-13935
Intermolecular energy-transfer processes
[DE84-000334] N84-13971
Experimental results on finite-beta limits and transport in the ISX-B Tokamak
[DE84-000258] N84-14001
ENGINE DESIGN
Flywheel rotor and containment technology development, FY83
[DE83-017615] N84-13589
ENGINE INLETS
An experimental investigation into the forebody and engine inlet airflow characteristics of a photographic reconnaissance window pallet on the RF/A-18 aircraft
[AD-A132271] N84-13167
ENGINE TESTS
Engine performance monitoring: Rolls-Royce Dart and Allison T56 turbo-prop engines
[ARL-MECH-ENG-NOTE-393] N84-13191
ENGINEERING MANAGEMENT
Symposium on Computers in Civil Engineering
[CSIR-S-267] N84-13806
ENGINES
Parametric testing and evaluation of a free-piston Stirling engine/linear-compressor system
[DE83-017282] N84-13590
ENTHALPY
Oak Ridge heat-pump models. Part 1. A steady-state computer design model for air-to-air heat pumps
[DE84-001577] N84-13519
Thermal modeling of laser welding with a quasi-1-dimensional approach
[DE84-001292] N84-13585
ENTRAINMENT
Mathematical model of electrostatic precipitation for the Texas Instruments Programmable 59 calculator
[PB83-261669] N84-13695
ENTROPY
Algorithms for single-signal and multisignal minimum-cross-entropy spectrum analysis
[AD-A132400] N84-13420
On a relation between Maximum-Likelihood classification and Minimum-Cross-Entropy classification
[AD-A132237] N84-13426
Eclipse mapping of accretion disks in cataclysmic binaries N84-14080
ENVIRONMENT EFFECTS
Studies of emotional instability in smoke from fires: Decrease of thinking powers and of memory in fire smoke N84-13355
Environmental impact research program. Two-equation, depth-integrated turbulence closure for modeling geometry-dominated flows
[AD-A132347] N84-13505
The effects of environment and dwell on high temperature fatigue crack growth of 2 1/4 Cr - 1 Mo steel
[AD-A132147] N84-13617
Atmospheric dispersion of ammonia: An ammonia fog model
[DE84-000165] N84-13689
Impact of enhanced solar UV-B radiation upon the marine ecosystem
[PB83-247411] N84-13694
Use of fauna as biomonitors
[DE83-016082] N84-13762
CEREAS: An interactive computer-mapping system for environmental assessments
[DE83-017927] N84-13864
ENVIRONMENTAL MONITORING
Satellite activities of NOAA (National Environmental Satellite Data and Information Service) 1982
[PB83-252510] N84-13747
Code BETAL to calculation Alpha/Beta activities in environmental samples
[JEN-549] N84-13816
CEREAS: An interactive computer-mapping system for environmental assessments
[DE83-017927] N84-13864
ENVIRONMENTAL QUALITY
Satellite activities of NOAA (National Environmental Satellite Data and Information Service) 1982
[PB83-252510] N84-13747
ENZYME ACTIVITY
Kinetic and spectroscopic studies of cytochrome b-563 in isolated cytochrome b/f complex and in thylakoid membranes
[DE83-017982] N84-13760
Respiration of roots response to low O2 stress
[DE83-017495] N84-13766
ENZYMES
Chemical and physical characterization of the activation of ribulosebiphosphate carboxylase/oxygenase
[DE83-017226] N84-13784
EPOXY COMPOUNDS
Surface science study of selective ethylene epoxidation catalyzed by the Ag(110) surface: Structural sensitivity
[DE84-001324] N84-13246
Testing of epoxy-phenolic coating for lining carbon steel pipe
[DE84-90073] N84-13322
Finite-element analysis of an epoxy-curing process
[DE84-000452] N84-13323
EPOXY MATRIX COMPOSITES
Processing science for AS/3501-6 carbon/epoxy composites
[AD-A132323] N84-13316
EPOXY RESINS
Cobalt ion-containing epoxies
[NASA-TM-85715] N84-13309
Aging of polymeric materials
[AD-A132250] N84-13318
Glass fibre/epoxy resin interface life-time prediction
[AD-A132206] N84-13320
EQUATIONS OF STATE
Aluminum as a global high-pressure equation-of-state standard
[DE84-000153] N84-13287
Equations governing the liquid-film flow over a plane with heat flux and interfacial phase change
[DE83-017528] N84-13525
Inertial effects in laser-drive ablation
[DE84-000071] N84-13566
EQUILIBRIUM
Studies of ions in a drift field: Laser diagnostics of excited states and measurements of thermochemical properties at equilibrium
[DE84-000363] N84-13562
Statistical properties of deep inelastic reactions
[DE84-000722] N84-13943
ERBIUM ALLOYS
Low-hysteresis materials for magnetic refrigeration: Gd sub 1-x/Er sub x/Al2
[DE84-001685] N84-13307
EROSION
Theoretical modeling of the plasma-erosion opening switch for inductive-storage applications
[DE84-001843] N84-13483
ERROR ANALYSIS
Aircraft navigation technology and errors
[GPO-26-859] N84-13170
Work done to determine the source of errors on conditioned pressure transduce signals in the JT9D-7F turbofan engines used on SAA Boeing 747 aircraft
[NIAST-82/78] N84-13192

ERROR FUNCTIONS
Deformable subreflector computed by geometric optics N84-13407
The amplitude density function and high-resolution frequency analysis of time series
[AD-A132466] N84-13906
ERYTHROCYTES
Coil planet centrifugation as a means for small particle separation
[NASA-TM-82561] N84-13756
ESCAPE (ABANDONMENT)
Escape and rescue model N84-13361
Effective-width model for evacuation flow N84-13362
Measuring evacuation difficulty N84-13363
ESTIMATES
An approximate method of estimating the aerodynamic interference between two parallel bodies (normal force and side force)
[NAL-TR-752] N84-13154
Analysis of lead-acid battery accelerated testing data
[DE83-017403] N84-13473
Parametric model for peak flow prediction in ungaged ephemeral watersheds
[PB83-249696] N84-13658
Rain estimation from satellites: An examination of the Griffith-Woodley technique
[NASA-TM-84969] N84-13735
On the growth of the spherical derivative of a meromorphic function N84-13785
Initial estimates of damping rates and frequencies
[ARL-STRUC-NOTE-485] N84-13879
Various solutions in multiple Bayesian's decision and multinormal estimation problems
[TR-78] N84-13882
ESTIMATING
The linear hierarchical model and its application in the econometric analysis
[CSIR-TWISK-274] N84-13875
Estimation of the Manova eigenvalues under the random effects model
[CSIR-TWISK-271] N84-13877
ETCHING
Electrochemical etching of titanium-alloy castings
[DE84-000244] N84-13266
ETHYLENE
Surface science study of selective ethylene epoxidation catalyzed by the Ag(110) surface: Structural sensitivity
[DE84-001324] N84-13246
EUCLIDEAN GEOMETRY
On the structure of self-similar fractals N84-13791
Quasiconformal semiflows N84-13792
On the order of quasiregular mappings N84-13793
F-harmonic measure in space N84-13794
On Fuchsian groups of accessible type N84-13795
EUTECTIC ALLOYS
Predicting the base phase in the crystallization of eutectic alloys
[BLL-M-35347-(5828.4)] N84-13262
EVACUATING (TRANSPORTATION)
A study on sound guidance for evacuation: Effect of megaphoned evacuation guidance in smoke N84-13356
Emergency evacuation flow models N84-13360
Escape and rescue model N84-13361
Effective-width model for evacuation flow N84-13362
EVALUATION
Evaluation of Hamamatsu R1635 photomultiplier
[DE84-001252] N84-13468
EVANESCENCE
Raman and fluorescent scattering by molecules embedded in small particles
[DE84-001278] N84-13937
EVAPORATION
Transport assessment: Arid task. Model verification studies
[DE84-000121] N84-13653
EXCIMER LASERS
Theoretical studies of oxygen-iodine laser mechanisms and new laser concepts
[AD-A132374] N84-13550
EXCITATION
Fields and currents and charges on obstacles in a parallel-plate simulator at selected frequencies and with pulse excitation
[AD-A132406] N84-13418
Laser-induced fluorescence line narrowing in atomic vapors
[DE83-018216] N84-13558
Liouvillian Green's-function theory of spectral line shape
[AD-A132467] N84-13894
Double beta decay: Recent developments and projections
[DE84-000476] N84-13944
EXHAUST EMISSION
Humidity measurement comparison tests: Dew point hygrometer versus wet bulb psychrometer
[PB83-237487] N84-13546
The effects of relaxing automobile emission standards: A generic analysis and an urban case study
[DE84-000193] N84-13693
Performance specifications for continuous monitoring of total reduced sulfur emissions (proposed July 20, 1981, 46 FR 37287), summary of comments and responses
[PB83-251009] N84-13696
EXHAUST NOZZLES
Inverted velocity profile semi-annular nozzle jet exhaust noise experiments
[NASA-TM-83525] N84-13924
EXOBIOLOGY
NASA space biology accomplishments, 1982
[NASA-TM-86244] N84-13206
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 251)
[NASA-SP-7011(251)] N84-13767
EXPANSION
Computations of turbulent recirculating flows with fully coupled solution of momentum and continuity equations
[DE84-001529] N84-13518
EXPERIMENT DESIGN
On smoke control experiments N84-13379
EXPERT SYSTEMS
PLY: A system of plausibility inference with a probabilistic basis
[AD-A132537] N84-13889
EXPLOSIVES
Theoretical modeling of converging and diverging detonation waves in solid and gaseous explosives
[DE83-017300] N84-13528
EXTINCTION
Optical properties of the marine aerosol as predicted by a BASIC version of the Navy aerosol model
[AD-A132411] N84-13986
EXTINGUISHING
Fire modeling research at Factory Mutual N84-13370
EXTRAGALACTIC RADIO SOURCES
Extragalactic emission-line objects and the Michigan-Tololo survey N84-14101
EXTREMELY HIGH FREQUENCIES
The 30 GHz communications satellite low noise receiver
[NASA-CR-168254] N84-13398
EXTREMELY LOW RADIO FREQUENCIES
An analysis of pC-3 micropulsion in the geomagnetic field
[AD-A132443] N84-13709
EXTRUDING
Extrusion. State of the art and development, review paper
[RAE-TRANS-2102] N84-13381

F

F-15 AIRCRAFT
Effect of thrust reverser operation on the lateral-directional characteristics of a three-surface F-15 model at transonic speeds
[NASA-TP-2234] N84-13165
FABRICATION
Low-cycle fatigue behavior of oxygen-free high-conductivity copper at 3000C in high vacuum
[DE84-000725] N84-13305
A rectangular gate merged MOSBJT
[AD-A132450] N84-13453
Introduction to flexible manufacturing systems: Their applications, classification, and opportunities
[DE83-017373] N84-13868
Preparation of infrared optic fibers using new materials
[AD-A132311] N84-13988
Chemical vapor deposition of oriented tungsten foils for thermionic cathodes
[AD-A132379] N84-14040
FAILURE ANALYSIS
A real-time implementation of an advanced sensor failure detection, isolation, and accommodation algorithm
[NASA-TM-83553] N84-13140
FAILURE MODES
Calculation of the life of components of metallurgical equipment from the parameter of failure probability
[BLL-M-35351-(5828.4F)] N84-13594
FARADAY EFFECT
Propagation effects on satellite systems at frequencies below 10 GHz, a handbook for satellite systems design, 1st edition
[NASA-RP-1108] N84-13397
FARM CROPS
Analysis of the quality of image data acquired by the LANDSAT-4 Thematic Mapper (TM) of the Black Hills area, South Dakota
[E84-10041] N84-13634
FARMLANDS
Information content of data from the LANDSAT 4 Thematic Mapper (TM) and multispectral scanner (MSS)
[E84-10034] N84-13628
The use of thematic mapper data for land cover discrimination: Preliminary results from the UK SATMaP programme
[E84-10038] N84-13631
Analysis of the quality of image data acquired by the LANDSAT-4 Thematic Mapper (TM) of the Black Hills area, South Dakota
[E84-10041] N84-13634
Photo interpretation key to Michigan land cover/use
[E84-10048] N84-13641
FASTENERS
Evaluation of stress corrosion cracking characteristics of selected fastener systems in 7075-T6 aluminum
[AD-A132162] N84-13272
Theoretical basis for design of thermal-stress-free fasteners
[NASA-TP-2226] N84-13614
FATIGUE (MATERIALS)
Fiber composite materials research in the UK: Assessment report
[AD-A132386] N84-13226
Creep fatigue of low-cobalt superalloys: Waspalloy, PM U 700 and wrought U 700
[NASA-CR-168260] N84-13265
Tensile and low-cycle fatigue measurements on cross-rolled tungsten at 1505 K
[DE84-000805] N84-13273
Improving the fatigue performance of thick aluminum alloy bolted joints by hole cold-expansion and the use of interference-fit steel bushes
[ARL-STRUC-NOTE-486] N84-13578
Effects of crack closure on ultrasonic transmission
[DE83-018073] N84-13599
Strain analysis of thin composites with Moire method
[NAL-TR-754] N84-13612
The effects of environment and dwell on high temperature fatigue crack growth of 2 1/4 Cr - 1 Mo steel
[AD-A132147] N84-13617
Detection of closed internal fatigue cracks
[DE83-017686] N84-13620
FATIGUE LIFE
Low-cycle fatigue behavior of oxygen-free high-conductivity copper at 3000C in high vacuum
[DE84-000725] N84-13305
Probabilistic fatigue life predictions of structural components in high-cycle fatigue regimes
[AD-A132425] N84-13615
FATIGUE TESTS
Biaxial fatigue, a review of the literature
[FRP-82/17] N84-13266
Low-cycle fatigue behavior of oxygen-free high-conductivity copper at 3000C in high vacuum
[DE84-000725] N84-13305
FATS
Adaptations to a high fat diet which increase exercise endurance in male rats N84-13755
FAULT TOLERANCE
Impossibility of distributed consensus with one faulty process
[AD-A132503] N84-13823
FAULTS
Algorithms for automated diagnosis of faults in physical plant
[DE84-000192] N84-13841
FEASIBILITY ANALYSIS
Feasibility of using a large press (80,000 - 200,000 tons) for manufacturing future components on Army systems
[AD-A132398] N84-13582
FEEDBACK CONTROL
An application of nonlinear programming to the design of regulators of a linear-quadratic formulation
[NASA-CR-17253] N84-13380
Analysis and control of quasi distributed parameter systems N84-13603
An experimental study of multi-link models of human postural dynamics and control N84-13769
FEEDERS
Hydraulic hoisting and backfilling
[CSIR-ME-452] N84-13498
FEMALES
Women at work and stress
[R/PERS-626] N84-13777
Cognitive components underlying the digit symbol test
[PB83-250464] N84-13779

FERRITES
High-Q perpendicular-biased ferrite-tuned cavity
[DE83-017291] N84-13478
FERRITIC STAINLESS STEELS
Corrosion of ferrous alloys in eutectic lead-lithium environments
[DE84-000593] N84-13292
FERROELECTRICITY
Targeted basic studies of ferroelectric and ferroelastic materials for piezoelectric transducer applications
[AD-A132136] N84-13461
Targeted basic studies of ferroelectric and ferroelastic materials for piezoelectric transducer applications
[AD-A132262] N84-14043
FERROMAGNETIC MATERIALS
Low-hysteresis materials for magnetic refrigeration: Gd sub 1-x/Er sub x/Al2
[DE84-001685] N84-13307
FERROMAGNETISM
Neutron-scattering studies of magnetic superconductors
[DE84-000393] N84-14054
FIBER COMPOSITES
The mechanics of delamination in fiber-reinforced composite materials. Part 2: Delamination behavior and fracture mechanics parameters
[NASA-CR-172270] N84-13222
FIBER OPTICS
Detectors for optical communications: A review
N84-13404
NOVANET: Communications network for a control system
[DE83-013862] N84-13436
Preparation of infrared optic fibers using new materials
[AD-A132311] N84-13988
Fiber optics temperature and pressure probe
[DE84-001785] N84-13990
Instrumentation for remote sensing over fiber optics
[DE84-001788] N84-13991
FIBER REINFORCED COMPOSITES
The mechanics of delamination in fiber-reinforced composite materials. Part 1: Stress singularities and solution structure
[NASA-CR-172269] N84-13221
The mechanics of delamination in fiber-reinforced composite materials. Part 2: Delamination behavior and fracture mechanics parameters
[NASA-CR-172270] N84-13222
Fiber composite materials research in the UK: Assessment report
[AD-A132386] N84-13226
Continuous plasma treatment and resin impregnation of a high-strength fiber material
[DE84-000314] N84-13229
FIBERS
Overview of composites capability at Lawrence Livermore National Laboratory
[DE84-001086] N84-13228
FIBERS (MATHEMATICS)
Great sphere fibrations of manifolds
[AD-A132544] N84-13888
FIELD EFFECT TRANSISTORS
Computer-aided synthesis and design of monolithic microwave GaAs MESFET amplifiers
[AD-A132474] N84-13452
An FET full-bridge switcher for inductorless capacitor charging for Nova
[DE83-018005] N84-13471
Low-noise gallium-arsenide field-effect transistor preamplifiers for stochastic beam-cooling systems
[DE83-017535] N84-13475
FIGHTER AIRCRAFT
Bifurcation theory applied to the study of control losses on combat aircraft N84-13144
FILE MAINTENANCE (COMPUTERS)
Participation of VAX VMS computers in IBM file-transfer networks
[DE83-017945] N84-13838
Proceedings of the Third LAN-Transport Workshop. Report of the Third Workshop for Local Area Network Implementors of the NBS Specifications of the International Standards Organization Transport Class 4 Protocol Special Interest Group on File Transfer Protocol
[PB83-251348] N84-13857
File migration in distributed computer systems
N84-13860
Network file-storage system
[DE84-001068] N84-13863
FINE STRUCTURE
EXAFS study of Metglas 2605 CO
[DE84-001203] N84-13299
FINITE DIFFERENCE THEORY
A fully vectorized numerical solution of the incompressible Navier-Stokes equations
[NASA-CR-174496] N84-13491
Fully-coupled solution of pressure-linked fluid flow equations
[DE83-017989] N84-13527
FINITE ELEMENT METHOD
Computational models for cyclic plasticity, rate dependence and creep in finite element analysis
[PB83-245829] N84-13308
Finite-element analysis of an epoxy-curing process
[DE84-000452] N84-13323
Finite elements and the divergence constraint for viscous flows N84-13486
Further studies on equal-order interpolation for Navier-Stokes
[DE84-000916] N84-13512
Construction and verification of a finite-element method for nonisothermal flows in porous media
[DE83-017158] N84-13522
Finite-element analysis of incompressible laminar and turbulent flow with heat transfer
[DE84-000042] N84-13523
Modelling of submerged cable dynamics
[AD-A132495] N84-13580
Alternative shock characterizations for consistent shock-test specification
[DE84-000482] N84-13619
Solution of groundwater-flow equations using an orthogonal finite-element scheme
[DE84-000690] N84-13648
User's manual for CABLE: A three-dimensional, finite-segment computer code for submerged and partially submerged cable systems
[AD-A132515] N84-13821
Development of a GIFTS (graphics-oriented interactive finite-element time-sharing system) plotting package compatible with either PLOT10 or IBM/DSM graphics
[AD-A132195] N84-13833
Computer implementation, accuracy, and timing of radiation view-factor algorithms
[DE83-017618] N84-13849
A Numerov-Galerkin technique applied to a finite element shallow-water equations model with enforced conservation of integral invariants and selective lumping
[CSIR-TWISK-276] N84-13878
NOSTRUM: A finite element program for nonlinear structural mechanics
[TR-18] N84-13881
Study of the optimal control problem solving in the Bolza form by the finite element method
[INPE-2750-PRE/326] N84-13884
FINNED BODIES
An experimental evaluation of the thermal performance of a rotating heat pipe with internal axial fins
[AD-A132553] N84-13504
FIRE DAMAGE
Human behavior N84-13352
Recent US progress in fire growth modeling
N84-13354
FIRE FIGHTING
Effect of carbon monoxide (CO) on firefighters
N84-13357
FIRE PREVENTION
Proceedings of the 6th Joint Panel Meeting: UJNR Panel on Fire Research and Safety N84-13341
Building systems and smoke control N84-13347
Present state of research in Japan on toxicities of gases during fire N84-13349
Smoke inhalation injury N84-13350
Human behavior N84-13351
Human behavior N84-13352
Recent Japanese progress in fire modeling
N84-13353
Recent US progress in fire growth modeling
N84-13354
Programmer's manual for the fire safety evaluation system cost minimizer computer program
[PB83-251447] N84-13395
FIRES
Fire investigation N84-13344
Recent Japanese progress in fire modeling
N84-13353
A study on sound guidance for evacuation: Effect of megaphoned evacuation guidance in smoke
N84-13356
The MGM Grand Hotel fire: A case study of human reaction to fire N84-13358
Project People 2: An extended interview study of behavior response patterns in health care facility fire incidents N84-13359
Measuring evacuation difficulty N84-13363
Modeling of compartment fires N84-13364
New modeling of compartment fires and problem of flashover N84-13365
Thermal instability in transient compartment fire: An approach to characterize flashover and estimate its mechanisms N84-13366
Similarity analysis of the flow characteristics in diffusion flames N84-13367
The computer fire codes and required new data
N84-13369
Fire modeling research at Factory Mutual N84-13370
Recent progress at NBS in fire growth modeling
N84-13372
Response of flame spread phenomena to ambient air stream velocity changes N84-13373
Study of biological samples obtained from victims of MGM Grand Hotel fire N84-13374
Proposed plan for joint research program between Japan, the USA and Canada concerning gas toxicity in fires N84-13378
FISCHER-TROPSCH PROCESS
Fischer-Tropsch synthesis in slurry reactors: Summary and analysis of the state of the art
[CSIR-CENG-432] N84-13234
FIXED WINGS
Rotor systems research aircraft: Fixed-wing simulations results
[NASA-TM-85863] N84-13176
FLAME PROPAGATION
Flame radiation and liner heat transfer in a tubular-can combustor
[NASA-TM-83538] N84-13188
Proceedings of the 6th Joint Panel Meeting: UJNR Panel on Fire Research and Safety N84-13341
New modeling of compartment fires and problem of flashover N84-13365
Thermal instability in transient compartment fire: An approach to characterize flashover and estimate its mechanisms N84-13366
Scaling laws on fire spread N84-13368
Flame heights, flame radiation and flame spread
N84-13371
Response of flame spread phenomena to ambient air stream velocity changes N84-13373
FLAME RETARDANTS
Proceedings of the 6th Joint Panel Meeting: UJNR Panel on Fire Research and Safety N84-13341
Current researches on fire retardant materials in Japan N84-13342
Fire and smoke retardants N84-13343
Automatic sprinklers N84-13348
FLAME SPECTROSCOPY
Acoustic modelling and analysis of pulsating combustion in a gas-fired pulse burner N84-13921
FLAME STABILITY
Response of flame spread phenomena to ambient air stream velocity changes N84-13373
Acoustic modelling and analysis of pulsating combustion in a gas-fired pulse burner N84-13921
FLAMEOUT
Flame heights, flame radiation and flame spread
N84-13371
Response of flame spread phenomena to ambient air stream velocity changes N84-13373
FLAMES
N(2) and CO vibrational CARS and h(2) rotational CARS spectroscopy of CH(4)-N(2)O flames
[AD-A132234] N84-13238
Flame fronts with complex chemical networks
[DE84-001175] N84-13255
Fire modeling research at Factory Mutual N84-13370
Flame heights, flame radiation and flame spread
N84-13371
FLAMMABILITY
Current researches on fire retardant materials in Japan N84-13342
Fire modeling research at Factory Mutual N84-13370
FLASHOVER
Proceedings of the 6th Joint Panel Meeting: UJNR Panel on Fire Research and Safety N84-13341
Recent Japanese progress in fire modeling
N84-13353
FLAVOR (PARTICLE PHYSICS)
Theoretical perspectives on strange physics
[DE83-018085] N84-13965
FLEXIBLE BODIES
Flight test and analyses of the B-1 structural mode control system at supersonic flight conditions
[NASA-CR-170405] N84-13197
FLIGHT ALTITUDE
Decompression procedures for flying after diving, and diving at altitudes above sea level
[AD-A132039] N84-13771
FLIGHT CHARACTERISTICS
Power effects on the longitudinal characteristics on single-engine propeller-driven aircraft
[ARL-AERO-REPT-157] N84-13174
FLIGHT RECORDERS
Crash Position Indicator/Crash Survivable Flight Data Recorder ejectable versus nonejectable
[AD-A132329] N84-13184

FLIGHT TESTS
Flight testing the Rotor Systems Research Aircraft (RSRA)
[NASA-TM-85852] N84-13177
FLOODS
Application of remote sensing to hydrological problems and floods
[E84-10046] N84-13639
FLOW
Complex eigenvalues for the stability of Couette flow
[NASA-CR-172251] N84-13492
FLOW CHARACTERISTICS
On some flow characteristics of conventional and excited jets
[NASA-TM-83503] N84-13922
FLOW DISTRIBUTION
An analytical method to calculate the flow field about blunt bodies of revolution at incidence in supersonic free stream flow
[CSIR-NIAST-82/72] N84-13156
A grid-embedding transonic flow analysis computer program for wing/nacelle configurations
[NASA-CR-166529] N84-13158
A computer program for the calculation of three-dimensional transonic nacelle/inlet flowfields
[NASA-CR-166528] N84-13159
Evaluation of non-intrusive flow measurement techniques for a re-entry flight experiment
[NASA-CR-172142] N84-13212
Fire modeling research at Factory Mutual N84-13370
Flame heights, flame radiation and flame spread N84-13371
Computation of viscous flow in curved ducts and comparison with experimental data
[NASA-TM-83548] N84-13494
Study of the contained air flow in a radial tire: Experimental
[DE84-000840] N84-13591
Solution of Poisson equations for 3-dimensional grid generations — computations of a flow field over a thin delta wing
[NASA-TM-85857] N84-13686
FLOW EQUATIONS
Similarity analysis of the flow characteristics in diffusion flames N84-13367
Solution of groundwater-flow equations using an orthogonal finite-element scheme
[DE84-000690] N84-13648
FLOW RESISTANCE
On smoke control experiments N84-13379
FLOW STABILITY
Multiple steady states of buoyancy induced flow in cold water and their stability N84-13487
Complex eigenvalues for the stability of Couette flow
[NASA-CR-172251] N84-13492
Two-dimensional accretion disk structure and stability N84-14090
FLOW VELOCITY
A helium refrigerator with features for supercritical pressure cooling
[DE84-017759] N84-13383
New relationships for turbulent plumes
[NAL-TR-763] N84-13495
FLOW VISUALIZATION
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-5, 210/September-October 1982
[ESA-TT-785] N84-13142
FLUID DYNAMICS
Reverse combustion along constant geometry fissures in heterogeneous fuels N84-13232
FLUID FLOW
A viscous-inviscid interactive procedure for rotational flow in cascades of two dimensional airfoils of arbitrary shape
[NASA-CR-174609] N84-13149
An analysis of the interaction between a submerged jet and a receiver-diffuser in a reverse-flow diverter
[DE83-012593] N84-13521
Fully-coupled solution of pressure-linked fluid flow equations
[DE83-017989] N84-13527
FLUIDIZED BED PROCESSORS
Fluidized-bed and salt-bath heat treating (AISI 4130 and 4340 alloy steels)
[DE84-000979] N84-13290
FLUORESCENCE
Laser-induced fluorescence spectroscopy for improved chemical analysis
[DE84-000629] N84-13243
Laser-induced fluorescence line narrowing in atomic vapors
[DE83-018216] N84-13558
Narrow-band, near-UV, high-repetition-rate laser-induced fluorescence system for use as an dge diagnostic in fusion machine
[DE84-000586] N84-13567
Atomic-beam density determination from laser-induced fluorescence interval distributions
[DE84-000677] N84-13571
Approach to single-molecule detection by laser-induced fluorescence
[DE84-001338] N84-13572
Raman and fluorescent scattering by molecules embedded in small particles
[DE84-001278] N84-13937
Intermolecular energy-transfer processes
[DE84-000334] N84-13971
Instrumentation for remote sensing over fiber optics
[DE84-001788] N84-13991
Dynamic aspects of the dye-sensitized photoconductivity of semiconductors
[DE84-001132] N84-14059
FLUX (RATE)
Evidence for a hot electron flux limit in laser-produced plasma experiments
[DE84-001365] N84-13555
FLYWHEELS
Flywheel rotor and containment technology development, FY83
[DE83-017615] N84-13589
FOCUSING
Proto-I axial-focusing experiments
[DE84-000458] N84-13951
Grad-B drift transport of high current electron beams
[DE84-000115] N84-13977
Colliding-beam-accelerator lattice
[DE83-017875] N84-14050
FOILS (MATERIALS)
The transient response of circular foil heat-flux gages
[DE83-017785] N84-13541
Chemical vapor deposition of oriented tungsten foils for thermionic cathodes
[AD-A132379] N84-14040
FOOD
Satellite activities of NOAA (National Environmental Satellite Data and Information Service) 1982
[PB83-252510] N84-13747
FOREBODIES
An experimental investigation into the forebody and engine inlet airflow characteristics of a photographic reconnaissance window pallet on the RF/A-18 aircraft
[AD-A132271] N84-13167
FOREST FIRES
Scaling laws on fire spread N84-13368
FORESTS
The use of thematic mapper data for land cover discrimination: Preliminary results from the UK SATMaP programme
[E84-10038] N84-13631
Photo interpretation key to Michigan land cover/use
[E84-10048] N84-13641
Forest statistics for southwest-north Alabama counties
[PB83-251314] N84-13662
The hardwood resource on nonindustrial private forest land in the southeast Piedmont
[PB83-252759] N84-13663
Forest statistics for southwest-south Alabama counties, Forest Service resource bulletin
[PB83-249763] N84-13664
The forest resources of Puerto Rico, Forest Service resource bulletin
[PB83-249995] N84-13665
Forest statistics for southeast Alabama counties, Forest Service resource bulletin
[PB83-250753] N84-13666
Forest area and timber resource statistcs for state and private lands in New Mexico, 1980, Forest Service resource bulletin
[PB83-251157] N84-13667
Forest statistics for west central Alabama counties, Forest Service resource bulletin
[PB83-249961] N84-13668
FORMAT
Short introduction to office applications of markup language
[DE83-011400] N84-13844
Standard format for data films --- synchrotron radiation sources
[DE84-J00345] N84-14068
FORTRAN
CI: A computer program for calculation of contact indexes which will correct reaction rates evaluated by mean quantities during simulation of turbulent combustion
[DE84-001000] N84-13244
Computer-aided synthesis and design of monolithic microwave GaAs MESFET amplifiers
[AD-A132474] N84-13452
Oak Ridge heat-pump models. Part 1. A steady-state computer design model for air-to-air heat pumps
[DE84-001577] N84-13519
User's manual for CABLE: A three-dimensional, finite-segment computer code for submerged and partially submerged cable systems
[AD-A132515] N84-13821
FOURIER SERIES
Application of the implicit Fourier-expansion method to the calculation of three-dimension equilibria by the iterative method
[DE83-017621] N84-13902
FOURIER TRANSFORMATION
Application of pseudoinversion to linear system identification with discrete measurements
[AD-A132283] N84-13422
FRACTIONATION
Microprobe analyses of rare-earth-element fractionation in meteoritic minerals
[DE83-017326] N84-14097
FRACTOGRAPHY
The effects of environment and dwell on high temperature fatigue crack growth of 2 1/4 Cr - 1 Mo steel
[AD-A132147] N84-13617
FRACTURE MECHANICS
The mechanics of delamination in fiber-reinforced composite materials. Part 1: Stress singularities and solution structure
[NASA-CR-172269] N84-13221
Three-dimensional analysis of chevron-notched specimens by boundary integral method
[NASA-CR-172225] N84-13607
Tensile strength of pressureless-sintered silicon nitride at elevated temperature
[NAL-TR-753] N84-13611
Effects of a finite aperture on the inverse born approximation
[DE83-018086] N84-13930
FRACTURE STRENGTH
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-5, 210/September-October 1982
[ESA-TT-785] N84-13142
FREDHOLM EQUATIONS
Quasicon formal extensions, Fredholm eigenvalues, and Grunsky coefficient conditions N84-13804
FREE ELECTRON LASERS
Simulation of a high-gain tapered-wiggler free-electron laser
[DE84-001237] N84-13557
New concepts in particle acceleration
[DE83-017747] N84-13961
Scientific program and abstracts
[DE83-017620] N84-13967
Conceptual design of a 300-GeV accelerator based on the inverse free-electron laser mechanism
[DE84-001471] N84-13969
FREE FLOW
An analytical method to calculate the flow field about blunt bodies of revolution at incidence in supersonic free stream flow
[CSIR-NIAST-82/72] N84-13156
Internal pressure distributions for a two-dimensional thrust-reversing nozzle operating at a free-stream Mach number of zero
[NASA-TM-85655] N84-13161
Response of flame spread phenomena to ambient air stream velocity changes N84-13373
FREQUENCIES
Initial estimates of damping rates and frequencies
[ARL-STRUC-NOTE-485] N84-13879
FREQUENCY ASSIGNMENT
Intercontinental time and frequency transfer using a global positioning system timing receiver N84-13411
FREQUENCY CONTROL
A frequency stabilization and trigger control unit for hybrid TEA-CO2 lasers
[AD-A132247] N84-13552
FREQUENCY MEASUREMENT
Nevada test site seismic-telemetry measurements
[DE84-000447] N84-13719
FREQUENCY MODULATION
Intercontinental time and frequency transfer using a global positioning system timing receiver N84-13411
Stress assessment through voice analysis
[AD-A132577] N84-13773
FREQUENCY MULTIPLIERS
Phase locked loop theory and application: A precis paper
[CSIR-NIAST-82/57] N84-13444
FRESH WATER
Stream-water storage in the ocean using an impermeable membrane
[PB83-248369] N84-13394
Survey of water quality and flow in Maryland coastal zone streams: A data report
[PB83-249375] N84-13660

FRESNEL LENSES
Design and development of a high-concentration and high-efficiency photovoltaic concentrator using a curved Fresnel lens
[DE84-000967] N84-13679

FRICTION
Slippery versus slip resistant work surfaces: The background for a regulatory definition
[PB83-243834] N84-13392
The influence of convective activity on the vorticity budget
[NASA-CR-3752] N84-13736

FRICTION MEASUREMENT
Measurement of rolling friction by a damped oscillator
[NASA-TP-2257] N84-13577

FUEL CELLS
Solid-oxide fuel cells
[DE83-017925] N84-13469
Moltencarbonate fuel cells, development status
[DE84-000612] N84-13480
Solubility of the NiO fuel-cell cathode in Li2CO3 melts as determined by cyclic voltammetry
[DE83-014311] N84-13485
Develop and test fuel cell powered on-site integrated total energy systems. Phase 3: Full-scale power plant development
[NASA-CR-168294] N84-13672

FUEL COMBUSTION
A gas turbine combustor test facility for fuel composition investigations
[AD-A132479] N84-13201
Investigation of sources, properties and preparation of distillate test fuels
[NASA-CR-168227] N84-13332
Atmospheric retention of anthropogenic CO2: Scenario dependence of the airborne fraction
[DE83-016854] N84-13723

FUEL CONSUMPTION
Range and endurance of jet-engined airplanes at constant altitude
[REPT-83-A1-SER-A] N84-13175
A gas turbine combustor test facility for fuel composition investigations
[AD-A132479] N84-13201
Economic benefits of operational environmental satellites
[PB83-252932] N84-13748

FUEL INJECTION
Hydrogen pellet injection into Alcator C
[DE83-016878] N84-14018

FUEL-AIR RATIO
Dependence of evolution of toxic gases on burning conditions N84-13377

FUNCTION SPACE
The specific solutions of a uniform algebraic differential equation of the second order
[ISSN-0066-1953] N84-13783
Twisted sums of nuclear Frechet spaces N84-13800

FUNCTIONAL ANALYSIS
The specific solutions of a uniform algebraic differential equation of the second order
[ISSN-0066-1953] N84-13783
Quasicon formal extensions, Fredholm eigenvalues, and Grunsky coefficient conditions N84-13804

FUNCTIONS (MATHEMATICS)
On the Fatou set of monic polynomials N84-13788

FUSELAGES
Vortex flap flow reattachment line and subsonic longitudinal aerodynamic data on 50 deg to 74 deg Delta wings on common fuselage
[NASA-TM-84618] N84-13160

FUSION REACTORS
External wave-launcher study
[DE84-001124] N84-13441
Neutron measurements and radiation damage calculations for fusion materials studies
[DE83-014790] N84-14011

G

GADOLINIUM ALLOYS
Low-hysteresis materials for magnetic refrigeration: Gd sub 1-x/Er sub x/Al2
[DE84-001685] N84-13307

GALACTIC COSMIC RAYS
Medium energy gamma rays from the galactic center region N84-14100

GALACTIC NUCLEI
Soft X-ray spectral observations of quasars and high X-ray luminosity Seyfert galaxies
[NASA-TM-85118] N84-14082
Self-consistent spherical accretion and models of quasars N84-14088

GALACTIC RADIO WAVES
A very large array 1411 MHz radio survey: Properties of complete samples of radio and optically selected QSO candidates in a high galactic-latitude field N84-14076

GALERKIN METHOD
Splines and the Galerkin method for solving the integral equations of scattering theory
[CSIR-TWISK-267] N84-13873
A Numerov-Galerkin technique applied to a finite element shallow-water equations model with enforced conservation of integral invariants and selective lumping
[CSIR-TWISK-276] N84-13878

GALLIUM ARSENIDES
Microwave monolithic integrated circuit development for future spaceborne phased array antennas
[NASA-TM-83518] N84-13399
Computer-aided synthesis and design of monolithic microwave GaAs MESFET amplifiers
[AD-A132474] N84-13452
Low-power radiation-hard GaAs RAM
[AD-A132325] N84-13457
Low-noise gallium-arsenide field-effect transistor preamplifiers for stochastic beam-cooling systems
[DE83-017535] N84-13475
A simple model of space radiation damage in GaAs solar cells
[NASA-TP-2242] N84-13978
X-ray and backscattering analysis of ion implantation phenomena in GaAs and related compounds
[AD-A132429] N84-14038

GAME THEORY
A solution technique for complex matrix games
[ARL-SYS-NOTE-83] N84-13910

GAMMA RAY ASTRONOMY
Medium energy gamma rays from the galactic center region N84-14100

GAMMA RAY BURSTS
Characteristics of gamma-ray line flares
[NASA-CR-174608] N84-14098
Physics of the synchrotron model of cosmic gamma-ray bursts
[DE84-000917] N84-14104
Inverse comptonization vs. thermal synchrotron
[DE84-001039] N84-14105
Theory of optical flashes
[DE84-001450] N84-14106

GAMMA RAY SPECTROMETERS
Telescope calibration for gamma spectroscopy with a new Ge(Li) diode configuration
[INPE-2885-PRE/407] N84-14083

GAMMA RAY TELESCOPES
Telescope calibration for gamma spectroscopy with a new Ge(Li) diode configuration
[INPE-2885-PRE/407] N84-14083

GAS ANALYSIS
Vacuum outgassing of various materials
[DE84-001449] N84-13247

GAS BEARINGS
Forced two-phase cooling of the TPC superconducting solenoid
[DE83-017749] N84-14049

GAS CHROMATOGRAPHY
The organic geochemistry of deep ground waters and radionuclide-partitioning experiment: Under hydrothermal conditions
[DE83-015784] N84-13651

GAS DISCHARGE TUBES
Electron-drift velocity and ionization and attachment coefficients in gases/mixtures for diffuse-discharge opening switches
[DE83-017206] N84-14017

GAS EVOLUTION
Comparison of measured and calculated helium production in nickel using newly evaluated neutron cross sections for (59)Ni
[DE84-000565] N84-14035

GAS IONIZATION
Motion of ionized electrons under the intense electromagnetic field of the beam
[DE84-001396] N84-13955

GAS LASERS
Design of a high-brightness, low-jitter, short-pulse laser for plasma diagnostics
[DE84-000129] N84-13564
Update of pulsed-laser processing technology for high-efficiency silicon solar cells
[DE84-000638] N84-13684

GAS TRANSPORT
Plasma/neutral gas transport in divertors and limiters
[DE84-001594] N84-14034

GAS TURBINE ENGINES
Development of recuperator manufacturing techniques, phase 2
[AD-A132448] N84-13581

GAS TURBINES
A gas turbine combustor test facility for fuel composition investigations
[AD-A132479] N84-13201
An experimental investigation of soot behavior in a gas turbine combustor
[AD-A132210] N84-13202

GASES
Present state of research in Japan on toxicities of gases during fire N84-13349
Dependence of evolution of toxic gases on burning conditions N84-13377
Vapor-phase heat-transport system
[DE84-001341] N84-13516
Electron-drift velocity and ionization and attachment coefficients in gases/mixtures for diffuse-discharge opening switches
[DE83-017206] N84-14017

GASOLINE
The determination of research octane number of gasoline fuels by octane analyzer
[AD-A132427] N84-13335

GATES (CIRCUITS)
A rectangular gate merged MOSBJT
[AD-A132450] N84-13453
Superregenerative amplifier in linear mode as a radar range gate-derivations
[DE84-000978] N84-13474

GENERAL AVIATION AIRCRAFT
Census of US civil aircraft
[PB83-252460] N84-13147

GEOCHEMISTRY
Summaries of physical research in the geosciences
[DE83-017885] N84-13624
Assessment of quality of data on tapes from the hydrogeochemical and stream sediment reconnaissance
[DE83-017697] N84-13647
Separated isotopes: Vital tools for science and medicine
[DE83-011646] N84-13981

GEODESY
Comparative assessment of LANDSAT-4 MSS and TM data quality for mapping applications in the southeast
[E84-10040] N84-13633

GEODYNAMICS
The Telecommunications and Data Acquisition Report
[NASA-CR-174610] N84-13401

GEOLOGICAL FAULTS
Geology of faults exposed in trenches in Crater Flat, Nye County, Nevada
[DE84-000181] N84-13716

GEOLOGICAL SURVEYS
Kriging of geological and physical parameters from Yucca Flat, NTS
[DE83-018227] N84-13625
Geologic survey in the south-central region of Mato Grosso
[E84-10039] N84-13632

GEOMAGNETISM
Interpretation of aeromagnetic anomalies of the Quadrilatero Ferrifero region
[INPE-2897-PRE/416] N84-13707
An analysis of pC-3 micropulsion in the geomagnetic field
[AD-A132443] N84-13709

GEOMETRIC ACCURACY
Analysis of multispectral scanner (MSS) and Thematic Mapper (TM) performance (pre-launch and post-launch)
[E84-10043] N84-13636
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E84-10050] N84-13643

GEOMETRY
FACET: A radiation-view-factor computer code for axisymmetric, 2D planar and 3D geometries with shadowing
[DE84-000359] N84-13835
Some grid generations using conformal mapping
[NAL-TR-758] N84-13871
Grid generation for cascades using conformal mapping
[NAL-TR-760] N84-13872

GEOPHYSICAL FLUIDS
Thermal and hydraulic performance of a sieve-tray direct-contact heat exchanger
[DE84-000663] N84-13531

GEOPHYSICS
Summaries of physical research in the geosciences
[DE83-017885] N84-13624
Natural hazards photograph catalog, key to geophysical records documentation no. 20
[PB83-250415] N84-13674

GEORGIA
Comparative assessment of LANDSAT-4 MSS and TM data quality for mapping applications in the southeast
[E84-10040] N84-13633

GEOTECHNICAL ENGINEERING
Correlation of LANDSAT and air photo linears with roof control problems and geologic features
[PB83-250852] N84-13656
GEOTHERMAL ENERGY EXTRACTION
Thermal and hydraulic performance of a sieve-tray direct-contact heat exchanger
[DE84-000663] N84-13531
Microseismic monitoring for evidence of geothermal heat in the capital district of New York
[PB83-248807] N84-13659
GEOTHERMAL RESOURCES
Summaries of physical research in the geosciences
[DE83-017885] N84-13624
Microseismic monitoring for evidence of geothermal heat in the capital district of New York
[PB83-248807] N84-13659
GERMANIUM
Double beta decay: Recent developments and projections
[DE84-000476] N84-13944
GERMANIUM DIODES
Telescope calibration for gamma spectroscopy with a new Ge(Li) diode configuration
[INPE-2885-PRE/407] N84-14083
GETTERS
Electrolytic gettering of tritius from air
[DE84-000174] N84-13252
A practical sublimation source for large-scale chromium gettering in fusion devices
[DE84-000724] N84-14002
GIANT STARS
An abundance analysis of the cool barium stars N84-14087
GLACIERS
Postglacial rebound observed by Lageos and the effective viscosity of the lower mantle
[NASA-TM-84982] N84-13705
GLACIOLOGY
Glaciological data: Permafrost. A bibliography, 1978 - 1982
[PB83-249730] N84-13724
GLASS
Relationship between the glass transition temperature and the chemical structure of polymers
[RAE-TRANS-2098] N84-13312
GLASS FIBER REINFORCED PLASTICS
Glass fibre/epoxy resin interface life-time prediction
[AD-A132208] N84-13320
GLASS FIBERS
Characterization of glass-filled engineering thermoplastic composites
[DE84-000361] N84-13231
GLASS LASERS
High energy efficient solid state laser sources — slab geometry laser sources
[NASA-CR-174606] N84-13548
GLIDE LANDINGS
Flight-test of the glide-slope track and flare-control laws for an automatic landing system for a powered-lift STOL airplane
[NASA-TP-2128] N84-13198
GLOBAL POSITIONING SYSTEM
Intercontinental time and frequency transfer using a global positioning system timing receiver N84-13411
GLOBULAR CLUSTERS
A study of A- and B-type stars in the southern galactic halo N84-14077
Surveys of globular cluster and galactic plane X-ray sources N84-14102
GLOW DISCHARGES
Effect of silane fraction on the optoelectronic and photovoltaic properties of RF-glow-discharge a-Si:H prepared from SiH4 + H2 mixtures
[DE83-016730] N84-14058
GOLD ALLOYS
Spectrographic investigation of gold by Grimm lamp
[CSIR-SR-283] N84-13233
GOODNESS OF FIT
Algorithm for computing significance levels using the Kolmogorov-Smirnov statistic and valid for both large and small samples
[DE84-001586] N84-13909
GOVERNMENT/INDUSTRY RELATIONS
Deregulating the airlines: An economic analysis
[PB83-250019] N84-14070
GRAIN BOUNDARIES
Grain boundary segregation and environmental degradation of a ferritic stainless steel
[DE83-016027] N84-13289
Characterization of alloy 600 surfaces after exposure to a caustic environment
[DE83-018297] N84-13300
Low-cycle fatigue behavior of oxygen-free high-conductivity copper at 300C in high vacuum
[DE84-000725] N84-13305
GRAPHITE
Relationships between strength, electrical conductivity, and density for oxidized PGX graphite
[DE83-016184] N84-13325
Origin of electron-bombardment enhanced reactivity of graphite with hydrogen
[DE83-017561] N84-13960
GRAPHITE-EPOXY COMPOSITES
The mechanics of delamination in fiber-reinforced composite materials. Part 1: Stress singularities and solution structure
[NASA-CR-172269] N84-13221
The mechanics of delamination in fiber-reinforced composite materials. Part 2: Delamination behavior and fracture mechanics parameters
[NASA-CR-172270] N84-13222
Flight service evaluation of advanced composite ailerons on the L-1011 transport aircraft
[NASA-CR-172246] N84-13223
Galvanic coupling between D6AC steel, 6061-T6 aluminum, Inconel 718 and graphite-epoxy composite material: Corrosion occurrence and prevention
[NASA-TP-2236] N84-13263
GRAPHS (CHARTS)
White Sands Missile Range, New Mexico Range reference atmosphere 0-70 km altitude
[AD-A132471] N84-13738
Planar embedding of planar graphs
[AD-A132538] N84-13820
Computerized art plotting system. Volume 1: Horizontal bar charts (second edition)
[DE83-018113] N84-13839
On bisecting random graphs
[AD-A132500] N84-13892
GRAVITATION
Potential means of support for materials processing in space. A history of government support for new technology
[NASA-TM-82554] N84-13205
Weightlessness and management of liquid rocket propellant
[AD-A132516] N84-13334
GRAVITATION THEORY
Test of the inverse square law of gravity at distances of 5cm and 1m N84-13914
GRAVITATIONAL EFFECTS
Structural analysis of a glass/space frame parabolic-trough solar collector for various operating positions
[DE84-001137] N84-13622
GRAVITATIONAL FIELDS
Postglacial rebound observed by Lageos and the effective viscosity of the lower mantle
[NASA-TM-84982] N84-13705
Large scale galactic shocks and motions of the cloud medium N84-14089
GRAVITATIONAL WAVES
Physics at the proposed National Underground Science Facility
[DE84-001345] N84-13203
GREEN FUNCTION
Liouvillian Green's-function theory of spectral line shape
[AD-A132467] N84-13894
GREENHOUSE EFFECT
Response of the North American corn belt to climate warming, CO2
[DE83-017873] N84-13721
Commentary on the recent CO2-climate controversy
[DE83-016367] N84-13722
GRIDS
Research, development and demonstration of lead-acid batteries for electric vehicle propulsion
[DE84-000468] N84-13464
GROUND EFFECT (AERODYNAMICS)
Analytical model of rotor wake aerodynamics in ground effect
[NASA-CR-166533] N84-13157
GROUND STATIONS
Design issues in the GCF Mark 4 development N84-13415
GROUND SUPPORT SYSTEMS
Operational applications of military test ranges in space transportation system programs
[AD-A132535] N84-13217
GROUND TRUTH
Geologic survey in the south-central region of Mato Grosso
[E84-10039] N84-13632
GROUND WATER
Solution of groundwater-flow equations using an orthogonal finite-element scheme
[DE84-000690] N84-13648
The organic geochemistry of deep ground waters and radionuclide-partitioning experiment: Under hydrothermal conditions
[DE83-015784] N84-13651
Oxygen-18 measurements in the assessment of natural and anthropogenic sulfur in the environment
[DE84-000566] N84-13690
Mobility of organic complexes of nickel and cobalt in soils
[DE83-017897] N84-13720
GROUP THEORY
On Fuchsian groups of accessible type N84-13795
Regular n-gons and Fuchsian groups N84-13798
Invariant means on semi-topological transformation semigroups N84-13912
Some double-valued representations of the linear groups
[DE84-001525] N84-13913
GROUT
Petrographic examination of Bell Canyon Tests (BCT) 1-FF field grouts over a 3-year period
[DE83-018226] N84-13654
GROWTH
Recent progress at NBS in fire growth modeling N84-13372
Electron-cyclotron maser and whistler instabilities in a relativistic electron plasma with loss-cone distribution
[DE84-001607] N84-13561
A general framework for learning curve reliability growth models
[AD-A132277] N84-13596
On the growth of the spherical derivative of a meromorphic function N84-13785
GUIDANCE (MOTION)
A study on sound guidance for evacuation: Effect of megaphoned evacuation guidance in smoke N84-13356
GYROSCOPES
On the effect of gyroscopic forces on the instability of certain fluid-elastic systems. Part 1: Definitions
[PUBL-340] N84-13499
Perturbation methods for slightly damped gyroscopic systems N84-13534
GYROSCOPIC STABILITY
On the effect of gyroscopic forces on the instability of certain fluid-elastic systems. Part 1: Definitions
[PUBL-340] N84-13499

H

HAFNIUM ALLOYS
The relationship between the martensitic phase transition and the superconducting properties of A15 compounds
[DE83-018186] N84-13477
HALF SPACES
The propagation and arrest of an edge crack in an elastic half-space under conditions of anti-plane shear: Analytical and numerical results N84-13604
HALL EFFECT
The quantum hall effect N84-14036
HAMILTONIAN FUNCTIONS
Meson-exchange Hamiltonian for NN scattering and isobar-nucleus dynamics
[DE83-017974] N84-13959
Hamiltonian formulation of reduced magnetohydrodynamics
[DE83-016758] N84-14021
HANDBOOKS
Handbook of aviation fuel properties
[AD-A132106] N84-13338
HANDLES
Temperature rise of handles and knobs
[BLL-OA-TRANS-3047-(6196.3)] N84-13502
HARDENING (MATERIALS)
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-6, 211/November-Decemter 1982
[ESA-TT-801] N84-13382
HARDNESS
Feasibility of using a large press (80,000 - 200,000 tons) for manufacturing future components on Army systems
[AD-A132398] N84-13582
HARMONIC FUNCTIONS
Positive biharmonic functions N84-13786
F-harmonic measure in space N84-13794
On the Harnack constant and the boundary behavior of Harnack functions N84-13796
HAZARDOUS MATERIAL DISPOSAL (IN SPACE)
Atmospheric dispersion of ammonia: An ammonia fog model
[DE84-000165] N84-13689
HAZARDS
A study on sound guidance for evacuation: Effect of megaphoned evacuation guidance in smoke N84-13356

Natural hazards photograph catalog, key to geophysical records documentation no. 20
[PB83-250415] N84-13674
HEAO 2
Surveys of globular cluster and galactic plane X-ray sources N84-14102
HEAT
Physiological responses of normotensives and essential hypertensives to exercise in the heat N84-13788
HEAT EXCHANGERS
Thermal and hydraulic performance of a sieve-tray direct-contact heat exchanger
[DE84-000663] N84-13531
HEAT FLUX
The transient response of circular foil heat-flux gages
[DE83-017785] N84-13541
A variational method for estimating the general circulation in the ocean N84-13626
Surface heat flux derived from sodar amplitude and frequency data: A comparison
[DE83-017930] N84-13717
HEAT MEASUREMENT
Cryogenic testing of the TPC superconducting solenoid
[DE84-000528] N84-13467
The transient response of circular foil heat-flux gages
[DE83-017785] N84-13541
HEAT PIPES
An experimental evaluation of the thermal performance of a rotating heat pipe with internal axial fins
[AD-A132553] N84-13504
An analysis of smooth and axially finned, rotating heat pipe condensers
[AD-A132141] N84-13509
HEAT PUMPS
Models of simultaneous heat and moisture transfer in soils
[DE84-001580] N84-13513
Oak Ridge heat-pump models. Part 1. A steady-state computer design model for air-to-air heat pumps
[DE84-001577] N84-13519
Development of a residential gas-absorption heat pump
[DE83-017218] N84-13526
Stirling-engine heat-actuated heat pump
[DE83-017137] N84-13529
Performance test results of an absorption heat pump which is designed to utilize low-temperature 600C (1400F) industrial waste heat
[DE83-017194] N84-13533
Parametric testing and evaluation of a free-piston Stirling engine/linear-compressor system
[DE83-017282] N84-13590
Hybrid space heating/cooling system with Trombe wall, underground venting, and assisted heat pump
[DE84-000406] N84-13686
HEAT RESISTANT ALLOYS
Replacing critical and strategic refractory metal elements in nickel-base superalloys --- NASA's COSAM program
[NASA-TM-83528] N84-13264
Creep fatigue of low-cobalt superalloys: Waspalloy, PM U 700 and wrought U 700
[NASA-CR-168260] N84-13265
HEAT SHIELDING
Intumescent reaction mechanisms: An analytic model
[AD-A132586] N84-13225
HEAT SINKS
Design and development of a high-concentration and high-effiecency photovoltaic concentrator using a curved Fresnel lens
[DE84-000967] N84-13679
HEAT TRANSFER
Flame radiation and liner heat transfer in a tubular-can combustor
[NASA-TM-83538] N84-13188
Temperature rise of handles and knobs
[BLL-OA-TRANS-3047-(6196.3)] N84-13502
An analysis of smooth and axially finned, rotating heat pipe condensers
[AD-A132141] N84-13509
Models of simultaneous heat and moisture transfer in soils
[DE84-001580] N84-13513
Vapor-phase heat-transport system
[DE84-001341] N84-13516
Oak Ridge heat-pump models. Part 1. A steady-state computer design model for air-to-air heat pumps
[DE84-001577] N84-13519
Heat transfer to subcooled HE 1
[DE83-017767] N84-13520
Experimental study of three-dimensional natural convection at high Rayleigh number
[DE83-011982] N84-13530
Surface heat flux derived from sodar amplitude and frequency data: A comparison
[DE83-017930] N84-13717
The effect of condensate inundation on steam condensation heat transfer to wire-wrapped tubing
[AD-A132175] N84-14060
HEAT TRANSFER COEFFICIENTS
An experimental evaluation of the thermal performance of a rotating heat pipe with internal axial fins
[AD-A132553] N84-13504
Condensation heat transfer of steam on a single horizontal tube
[AD-A132245] N84-13508
HEAT TREATMENT
Fluidized-bed and salt-bath heat treating (AISI 4130 and 4340 alloy steels)
[DE84-000979] N84-13290
Feasibility of using a large press (80,000 - 200,000 tons) for manufacturing future components on Army systems
[AD-A132398] N84-13582
HEAVY IONS
Radiation-induced phosphorus segregation in austenitic and ferritic alloys
[DE84-000903] N84-13302
Control and operation cost optimization of the HISS cryogenic system
[DE83-017741] N84-13384
High-sensitivity laser spectroscopy with atoms from a cooled helium jet
[DE84-000614] N84-13554
Statistical properties of deep inelastic reactions
[DE84-000722] N84-13943
Acceleration of heavy ions in the AGS and CBA
[DE83-017762] N84-13963
New heavy-ion-fusion accelerator research program
[DE83-014898] N84-14016
HELICOPTER DESIGN
Helicopter vertical stabilizer design considerations
[AD-A132308] N84-13180
HELICOPTERS
Helicopter In-flight Monitoring System second generation (HIMS 2)
[AD-A132498] N84-13179
Helicopter vertical stabilizer design considerations
[AD-A132308] N84-13180
HELIUM
Effect of phosphorus on the swelling and precipitation behavior of austenitic stainless steels during irradiation
[DE84-000412] N84-13275
Effect of implanted helium on the microstructure and creep properties of ordered (Fe0.49 Ni0.51)V-3 alloys
[DE84-000691] N84-13278
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 1: Microstructural response to neutron irradiation
[DE84-001298] N84-13283
Fermilab satellite refrigerator compressors with the oil- and moisture-removal systems
[DE83-017328] N84-13386
Observations of nonlinear behavior in a low-pressure discharge column
[AD-A132321] N84-13996
Neutron measurements and radiation damage calculations for fusion materials studies
[DE83-014790] N84-14011
Comparison of measured and calculated helium production in nickel using newly evaluated neutron cross sections for (59)Ni
[DE84-000565] N84-14035
Forced two-phase cooling of the TPC superconducting solenoid
[DE83-017749] N84-14049
HELIUM ISOTOPES
Quantum-mechanical calculations of the properties of liquid He droplets
[DE84-000164] N84-13220
HELMET MOUNTED DISPLAYS
The effects of character stroke width on the visibility of a head-coupled display
[AD-A132046] N84-13183
HEURISTIC METHODS
Model Statement Language/analyzer (MSL/MSA): A top-down Problem Statement Language/analyzer (PSL/PSA) approach for the user dialogue in decision support systems
[AD-A132273] N84-13829
On bisecting random graphs
[AD-A132500] N84-13892
HIERARCHIES
The linear hierarchical model and its application in the econometric analysis
[CSIR-TWISK-274] N84-13875
HIGH ENERGY ELECTRONS
Medium energy gamma rays from the galactic center region N84-14100
HIGH ENERGY INTERACTIONS
Energetic-particle stabilization of ballooning modes in Tokamaks
[DE83-016205] N84-14020
Radiation damage in silicon detectors
[DE84-001460] N84-14056
HIGH FLUX ISOTOPE REACTORS
Microstructure of 9 Cr-1 MoVNb steel irradiated to 40 dpa at elevated temperatures in HFIR
[DE84-000339] N84-13285
HIGH FREQUENCIES
Holographic optical elements with ultra-high spatial frequencies
[AD-A132355] N84-13537
The amplitude density function and high-resolution frequency analysis of time series
[AD-A132466] N84-13906
HIGH LEVEL LANGUAGES
FORTH: An unconventional programming language
[INPE-2894-PRE/413] N84-13813
Utilization of Ada as a program design language
[AD-A132244] N84-13830
FASTBUS diagnostic language users manual, version 3(74)
[DE83-017932] N84-13837
SISAL: Streams and Iteration in a Single-Assignment Language. Language reference manual, version 1.1
[DE83-016576] N84-13843
HIGH POWER LASERS
High energy efficient solid state laser sources --- slab geometry laser sources
[NASA-CR-174606] N84-13548
HIGH PRESSURE
Aluminum as a global high-pressure equation-of-state standard
[DE84-000153] N84-13287
HIGH RESOLUTION
Computed survey spectra of 2-5 micron atmospheric absorption
[AD-A132526] N84-13706
The amplitude density function and high-resolution frequency analysis of time series
[AD-A132466] N84-13906
HIGH TEMPERATURE
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 2. Dual-ion irradiations
[DE84-001297] N84-13282
Solid-oxide fuel cells
[DE83-017925] N84-13469
Hamiltonian formulation of reduced magnetohydrodynamics
[DE83-016758] N84-14021
HIGH TEMPERATURE AIR
The effects of environment and dwell on high temperature fatigue crack growth of 2 1/4 Cr - 1 Mo steel
[AD-A132147] N84-13617
HIGH TEMPERATURE ENVIRONMENTS
Characterization of the general purpose research furnace for low-G directional solidification experiments
[NASA-TM-85718] N84-13211
HIGH TEMPERATURE TESTS
Tensile strength of pressureless-sintered silicon nitride at elevated temperature
[NAL-TR-753] N84-13611
HIGH VACUUM
Interaction of a stream of dielectric spheres in an electric field in a high vacuum
[DE83-013695] N84-13958
HIGHWAYS
Detection of cracks on highway pavements
[PB83-238204] N84-13389
HISTORIES
Life histories and monitoring strategies: Some lessons from field experience
[DE83-016164] N84-13763
HOLES
Improving the fatigue performance of thick aluminum alloy bolted joints by hole cold-expansion and the use of interference-fit steel bushes
[ARL-STRUC-NOTE-486] N84-13578
HOLES (ELECTRON DEFICIENCIES)
Density of occupied d states in transition metal-metalloid metallic glasses
[DE84-001206] N84-13298
HOLOGRAPHIC INTERFEROMETRY
La Recherche Aerospatiale, Biomonthly Bulletin, no. 1982-4, 209/July-August 1982
[ESA-TT-781] N84-13141
HOLOGRAPHY
A compact optical pulse compressor with computer-generated holographic masks for radar applications
[AD-A132152] N84-13430
Holographic optical elements with ultra-high spatial frequencies
[AD-A132355] N84-13537

HOMOGENEITY
The specific solutions of a uniform algebraic differential equation of the second order N84-13790
HOMOGENEOUS TURBULENCE
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-4, 209/July-August 1982
[ESA-TT-781] N84-13141
HOMOMORPHISMS
The specific solutions of a uniform algebraic differential equation of the second order N84-13790
HOMOTOPY THEORY
Great sphere fibrations of manifolds
[AD-A132544] N84-13688
HOT WORKING
Thermomechanical processing of M-50 steel
[AD-A132272] N84-13271
HUMAN BEHAVIOR
Human behavior N84-13351
Human behavior N84-13352
Studies of emotional instability in smoke from fires: Decrease of thinking powers and of memory in fire smoke N84-13355
The MGM Grand Hotel fire: A case study of human reaction to fire N84-13358
Project People 2: An extended interview study of behavior response patterns in health care facility fire incidents N84-13359
HUMAN BODY
An experimental study of multi-link models of human postural dynamics and control N84-13769
HUMAN PERFORMANCE
Measuring evacuation difficulty N84-13363
A comparative study of the factors linking psychology and information science N84-14063
HUMAN REACTIONS
The MGM Grand Hotel fire: A case study of human reaction to fire N84-13358
Project People 2: An extended interview study of behavior response patterns in health care facility fire incidents N84-13359
HUMIDITY
Storage of synthetic turbine lubricants under adverse conditions
[AD-A132226] N84-13319
Development of a technique for short-term prediction of hydrometeors using advection and physical forcing
[AD-A132259] N84-13740
Recommended values of the humidity correction factor k sub h for determining exposure in an X-ray beam with free-air chambers
[JEN-542] N84-13915
HUMIDITY MEASUREMENT
Humidity measurement comparison tests: Dew point hygrometer versus wet bulb psychrometer
[PB83-237487] N84-13546
HYBRID CIRCUITS
MM and T: Ceramic metal substrates for hybrid electronics
[AD-A132514] N84-13313
HYDRAULIC EQUIPMENT
Hydraulic hoisting and backfilling
[CSIR-ME-452] N84-13498
HYDROCARBONS
Positive ion-molecule reactions in OCS/hydrocarbon mixtures
[AD-A132350] N84-13237
Vapor degreaser/ultrasonic cleaner solvent evaluation
[DE84-002015] N84-13331
Radiative transfer and photochemistry in the upper atmosphere of Jupiter N84-14095
HYDRODYNAMICS
Environmental impact research program. Two-equation, depth-integrated turbulence closure for modeling geometry-dominated flows
[AD-A132347] N84-13505
Computation of turbulent reacting flows: Comparison of various mixing/chemistry interaction models
[DE84-000998] N84-13514
Proceedings of the 4th International Conference on Physicochemical Hydrodynamics
[DE83-012765] N84-13532
Nonlinear acoustics in a dispersive continuum: Random waves, radiation pressure, and quantum noise N84-13920
HYDROELECTRIC POWER STATIONS
Design and evaluation of small water turbines
[DE84-000404] N84-13586
HYDROGEN
Diffusivities of hydrogen in yttrium and yttrium alloys
[DE84-000411] N84-13296
Origin of electron-bombardment enhanced reactivity of graphite with hydrogen
[DE83-017561] N84-13960
Neutron measurements and radiation damage calculations for fusion materials studies
[DE83-014790] N84-14011
Hydrogen pellet injection into Alcator C
[DE83-016878] N84-14018
Steady-state hydrogen transport in solids exposed to fusion-reactor plasmas. Part 3: Applications of theory
[DE84-001646] N84-14033
Ionization equilibrium in isolated H 2 regions N84-14086
HYDROGEN EMBRITTLEMENT
Grain boundary segregation and environmental degradation of a ferritic stainless steel
[DE83-016927] N84-13289
Analysis of hydrogen attack on pressure-vessel steels
[DE84-00061] N84-13301
HYDROGEN FUELS
Aerodynamic characteristics, including effect of body shape, of a Mach 6 aircraft concept
[NASA-TP-2235] N84-13164
HYDROGEN PRODUCTION
Development of electrolysis-cell separator for 1250C operation. Advanced alkaline electrolysis cell development
[DE84-000439] N84-13484
Analysis and modeling of photosynthetic bacterial hydrogen production plants
[DE84-000003] N84-13758
HYDROGENATION
Selective catalytic hydrogenation of polynuclear heteroaromatic nitrogen compounds with polymer-supported transition-metal compounds
[DE84-001326] N84-13248
HYDROLOGY
Summaries of physical research in the geosciences
[DE83-017885] N84-13624
Application of remote sensing to hydrological problems and floods
[E84-10046] N84-13639
Development of design hyetographs for southern Nevada
[DE84-001227] N84-13649
Proceedings of the 3rd LAN-Transport Workshop. Report of the third workshop for local area network implementors of the NBS specifications of the International Standards Organization transport class 4 protocol: Special interest group on file transfer protocol
[PB83-251348] N84-13657
Parametric model for peak flow prediction in ungaged ephemeral watersheds
[PB83-249696] N84-13658
HYDROMETEOROLOGY
Development of a technique for short-term prediction of hydrometeors using advection and physical forcing
[AD-A132259] N84-13740
HYDROXYL RADICALS
Early mechanisms in radiation-induced biological damage
[DE84-001511] N84-13765
HYGROMETERS
Humidity measurement comparison tests: Dew point hygrometer versus wet bulb psychrometer
[PB83-237487] N84-13546
HYPERFINE STRUCTURE
High-sensitivity laser spectroscopy with atoms from a cooled helium jet
[DE84-000614] N84-13554
HYPERSONIC AIRCRAFT
Aerodynamic characteristics, including effect of body shape, of a Mach 6 aircraft concept
[NASA-TP-2235] N84-13164
HYPERSONIC VEHICLES
Preliminary scramjet design for hypersonic airbreathing missile application
[NASA-CR-3742] N84-13195
Enhancement of the CAVE computer code --- aerodynamic heating package for nose cones and scramjet engine sidewalls
[NASA-CR-3731] N84-13501
HYPERSONIC WIND TUNNELS
High altitude aerodynamic tests with simulated heat-shield outgassing
[AD-A132078] N84-13227
HYPERTENSION
Physiological responses of normotensives and essential hypertensives to exercise in the heat N84-13768
HYPERVELOCITY IMPACT
Impact cratering and spall failure at gabbro
[NASA-CR-174618] N84-13704
HYPERVELOCITY LAUNCHERS
Shot to the moon from a cannon
[AD-A132554] N84-13216
HYSTERESIS
Low-hysteresis materials for magnetic refrigeration: Gd sub 1-x/Er sub x/Al2
[DE84-001685] N84-13307

I

IBM COMPUTERS
Communicating between the IBM personal computer and the Wang word-processing system
[DE83-017987] N84-13809
Participation of VAX VMS computers in IBM file-transfer networks
[DE83-017945] N84-13838
ICE FORMATION
Performance degradation of a typical twin engine commuter type aircraft in measured natural icing conditions
[NASA-TM-83564] N84-13173
IGNITION
Recent US progress in fire growth modeling N84-13354
The computer fire codes and required new data N84-13369
Theoretical modeling of converging and diverging detonation waves in solid and gaseous explosives
[DE83-017300] N84-13528
ILLINOIS
Geology of carbonate aggregate resources of Illinois, Illinois mineral notes
[PB83-251140] N84-13725
IMAGE ANALYSIS
Information content of data from the LANDSAT 4 Thematic Mapper (TM) and multispectral scanner (MSS)
[E84-10034] N84-13628
LANDSAT 4 image data quality analysis
[E84-10036] N84-13629
The use of linear feature detection to investigate thematic mapper data performance and processing
[E84-10037] N84-13630
Analysis of the quality of image data acquired by the LANDSAT-4 Thematic Mapper (TM) of the Black Hills area, South Dakota
[E84-10041] N84-13634
IMAGE PROCESSING
Reflection and identification studies applied to terrain imaging radar
[AD-A132401] N84-13419
The United Kingdom SATMaP program
[E84-10002] N84-13627
The use of linear feature detection to investigate thematic mapper data performance and processing
[E84-10037] N84-13630
Comparative assessment of LANDSAT-4 MSS and TM data quality for mapping applications in the southeast
[E84-10040] N84-13633
Rise in the frequency of cloud cover in LANDSAT data for the period 1973 to 1981 --- Brazil
[E84-10047] N84-13640
Generating three-dimensional surface models of solid objects from multiple projections
[AD-A132392] N84-13824
Overview of digital-image processing
[DE84-000156] N84-13848
Advanced pattern recognition
[AD-A132339] N84-13987
IMAGE RESOLUTION
Analysis of multispectral scanner (MSS) and Thematic Mapper (TM) performance (pre-launch and post-launch)
[E84-10043] N84-13636
IMAGING TECHNIQUES
Interactive surface visualization using raster graphics
[AD-A132548] N84-13819
The development of an imaging gas scintillation proportional counter for use in X-ray astronomy N84-14079
IMPACT DAMAGE
Impact cratering and spall failure at gabbro
[NASA-CR-174618] N84-13704
IMPACT LOADS
Alternative shock characterizations for consistent shock-test specification
[DE84-000482] N84-13619
IMPACT TESTS
Testing of epoxy-phenolic coating for lining carbon steel pipe
[DE84-90073] N84-13322
IMPEDANCE
Decoupling ion efficiency from impedance in pulsed power diodes
[DE83-018114] N84-13470
Theoretical modeling of the plasma-erosion opening switch for inductive-storage applications
[DE84-001843] N84-13483
IMPLOSIONS
Laser-plasma interaction at 10.6 microns
[DE84-001038] N84-13560

IMPURITIES
Narrow-band, near-UV, high-repetition-rate laser-induced fluorescence system for use as an oge diagnostic in fusion machine
[DE84-000586] N84-13567
Radiation hardening of oxygen-doped niobium by 14-MeV neutrons
[DE84-000103] N84-14026
INCIDENCE
An analytical method to calculate the flow field about blunt bodies of revolution at incidence in supersonic free stream flow
[CSIR-NIAST-82/72] N84-13156
INCLUSIONS
Formation of structure of low-alloy steel inoculated with rare-earth metals and alkaline-earth metals
[BLL-M-35321] N84-13258
Ultrasonic 3-D reconstruction of inclusions in solids using the inverse Born algorithm
[DE83-018082] N84-13928
INCOMPRESSIBLE FLOW
Numerical modeling of turbulent flow in a channel
[NASA-CR-168278] N84-13189
Finite-element analysis of incompressible laminar and turbulent flow with heat transfer
[DE84-000042] N84-13523
INCONEL (TRADEMARK)
Galvanic coupling between D6AC steel, 6061-T6 aluminum, Inconel 718 and graphite-epoxy composite material: Corrosion occurrence and prevention
[NASA-TP-2236] N84-13263
Oxidation of Inconel alloy MA754 at low oxidation potential
[DE83-017191] N84-13288
Characterization of alloy 600 surfaces after exposure to a caustic environment
[DE83-018297] N84-13300
INDUCTANCE
Electrical and thermal modeling of railguns
[DE84-001361] N84-13387
INDUSTRIAL ENERGY
County-level wind resource estimates for DOE Region 5
[DE84-000009] N84-13744
INDUSTRIAL MANAGEMENT
Techniques of condition monitoring and fault diagnosis in industry N84-13595
INDUSTRIAL PLANTS
Algorithms for automated diagnosis of faults in physical plant
[DE84-000192] N84-13841
INDUSTRIAL WASTES
Performance test results of an absorption heat pump which is designed to utilize low-temperature 600C (1400F) industrial waste heat
[DE83-017194] N84-13533
INDUSTRIES
Fiber composite materials research in the UK: Assessment report
[AD-A132386] N84-13226
INELASTIC STRESS
Inelastic analysis of piping and tubular structures
[PB83-249987] N84-13623
INEQUALITIES
On L sup p-integrability in PDE's and quasiregular mappings for large exponents N84-13799
INERTIAL CONFINEMENT FUSION
A laser-fusion rocket for interplanetary propulsion
[DE84-001238] N84-13219
Scientific program and abstracts
[DE83-017620] N84-13967
Grad-B drift transport of high current electron beams
[DE84-000115] N84-13977
Analysis of mechanisms for anode plasma formation in ion diodes
[DE83-017793] N84-14010
New heavy-ion-fusion accelerator research program
[DE83-014898] N84-14016
Infant-mortality testing of high-energy-density capacitors used on Nova
[DE83-018027] N84-14028
Hybrid ion diode theory and computations
[DE84-000102] N84-14029
INFERENCE
PLY: A system of plausibility inference with a probabilistic basis
[AD-A132537] N84-13889
INFLUENCE COEFFICIENT
Quasicon formal extensions, Fredholm eigenvalues, and Grunsky coefficient conditions N84-13804
INFORMATION
Decision making and information processing under various uncertainty conditions
[AD-A132051] N84-13770
INFORMATION RETRIEVAL
Fire investigation N84-13344
A program for the automatic request of magnetic tapes filling and reading of its contents (processor PCINTA)
[JEN-545] N84-13815
Management and display of data analysis environments for large data sets
[DE84-001414] N84-14069
INFORMATION SYSTEMS
Fiber composite materials research in the UK: Assessment report
[AD-A132386] N84-13226
Fire investigation N84-13344
On the interactions of incentive and information structures
[DE83-012084] N84-14065
TIS: An intelligent gateway computer for information and modeling networks. Overview
[DE83-017986] N84-14067
INFORMATION THEORY
Cognitive components underlying the digit symbol test
[PB83-250464] N84-13779
A comparative study of the factors linking psychology and information science N84-14063
INFRARED ABSORPTION
Optical properties of the marine aerosol as predicted by a BASIC version of the Navy aerosol model
[AD-A132411] N84-13986
INFRARED DETECTORS
Spatial filtering for enhancing point targets in images from a space-based mosaic IR detector
[AD-A132248] N84-13425
INFRARED IMAGERY
Rain estimation from satellites: An examination of the Griffith-Woodley technique
[NASA-TM-84969] N84-13735
INFRARED INSTRUMENTS
Calculation of atmospheric transmittance by IBM 3033 computer code LOWTRAN IIIB
[AD-A132123] N84-13989
INFRARED SPECTRA
Preparation of infrared optic fibers using new materials
[AD-A132311] N84-13988
INFRARED SPECTROSCOPY
Vibrational spectroscopy of chemisorbed molecules by infrared emission
[DE84-000956] N84-13973
INFRARED TELESCOPES
Baffle system employing reflective surfaces
[NASA-TM-84406] N84-13985
INHOMOGENEITY
The plane stress/strain analysis of non-homogeneous continua by the boundary integral equation method
[TR-821S] N84-13880
INLET FLOW
A computer program for the calculation of three-dimensional transonic nacelle/inlet flowfields
[NASA-CR-166528] N84-13159
Three-dimensional viscous design methodology for advanced technology aircraft supersonic inlet systems
[NASA-TM-83558] N84-13190
INSPECTION
Penetrant and magnetic-particle inspection for material integrity
[DE83-017830] N84-13600
INSTRUMENT FLIGHT RULES
Aircraft accident report - A. E. Staley Manufacturing Company, Inc., Canadair Challenger CL-600, N805C, Hailey, Idaho, January 3, 1983
[PB83-910405] N84-13169
INSTRUMENT PACKAGES
NRIO microcomputer system
[CSIR-T/SEA-8134] N84-13805
INSTRUMENTS
Digital instrumentation package or an improved torsion pendulum
[PB83-240424] N84-13547
INSULATORS
Dynamic aspects of the dye-sensitized photoconductivity of semiconductors
[DE84-001132] N84-14059
INTEGRAL EQUATIONS
FACET: A radiation-view-factor computer code for axisymmetric, 2D planar and 3D geometries with shadowing
[DE84-000359] N84-13835
Splines and the Galerkin method for solving the integral equations of scattering theory
[CSIR-TWISK-267] N84-13873
The plane stress/strain analysis of non-homogeneous continua by the boundary integral equation method
[TR-821S] N84-13880
INTEGRATED CIRCUITS
Microwave monolithic integrated circuit development for future spaceborne phased array antennas
[NASA-TM-83518] N84-13399
ESD evaluation of radiation-hardened, high-reliability CMOS and MNOS ICs
[DE84-000138] N84-13481
INTERACTIVE CONTROL
FORTH: An unconventional programming language
[INPE-2894-PRE/413] N84-13813
An interdisciplinary oceanographic database
[CSIR-T/SEA-8207] N84-14064
Management and display of data analysis environments for large data sets
[DE84-001414] N84-14069
INTERFACES
Application of surface-physics techniques to the study of electrochemical systems
[DE84-000957] N84-13245
Signal processor interface simulation of the AN/SPY-1A radar controller
[AD-A132170] N84-13429
The FASTBUS segment driver microcode description
[DE83-017972] N84-13437
INTAC: A computer-aided test interface
[INPE-2792-TDL/138] N84-13446
Logic design of a shared disk system in a multi-micro computer environment
[AD-A132165] N84-13662
INTERGRANULAR CORROSION
Characterization of alloy 600 surfaces after exposure to a caustic environment
[DE83-018297] N84-13300
INTERMOLECULAR FORCES
Prediction of high-pressure phase transitions in solid N2 and the pressure dependence of the intramolecular vibrational frequencies
[DE83-015260] N84-14057
INTERNATIONAL COOPERATION
US-Japan cooperative research on evaluation of toxicity N84-13375
Proposed plan for joint research program between Japan, the USA and Canada concerning gas toxicity in fires N84-13378
INTERPOLATION
Further studies on equal-order interpolation for Navier-Stokes
[DE84-000916] N84-13512
On interpolation methods for boundary value ordinary differential equations N84-13669
INTERPROCESSOR COMMUNICATION
Communicating between the IBM personal computer and the Wang word-processing system
[DE83-017987] N84-13809
INTERSTELLAR GAS
Large scale galactic shocks and motions of the cloud medium N84-14089
INVENTORY MANAGEMENT
The forest resources of Puerto Rico, Forest Service resource bulletin
[PB83-249995] N84-13665
Forest statistics for southeast Alabama counties, Forest Service resource bulletin
[PB83-250753] N84-13666
INVERSIONS
Aerosol size distribution using the extinction-sedimentation inversion technique
[AD-A132158] N84-13711
Conceptual design of a 300-GeV accelerator based on the inverse free-electron laser mechanism
[DE84-001471] N84-13969
Inverse plasma equilibria
[DE84-000723] N84-14008
INVESTIGATION
Fire investigation N84-13344
INVISCID FLOW
A viscous-inviscid interactive procedure for rotational flow in cascades of two dimensional airfoils of arbitrary shape
[NASA-CR-174609] N84-13149
Pseudospectral solution of inviscid flows with multiple discontinuities
[AD-A132084] N84-13510
IODINE 131
Nuclear-medicine
[DE84-000346] N84-13759
ION ACCELERATORS
New heavy-ion-fusion accelerator research program
[DE83-014898] N84-14016
ION ACOUSTIC WAVES
Filamentation instability of ion acoustic waves driven by a scattered relativistic beam
[DE84-001323] N84-13956
ION BEAMS
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidificatior :essing. Part 2. Dual-ion irradiations
[DE84-001297] N84-13282

The Marshall Space Flight Center Low-Energy Ion Facility: A preliminary report
[NASA-TM-82559] N84-13933
Magnetic field measurements of superconducting magnets for the colliding beam accelerator
[DE83-017351] N84-13982
Ion-beam surface analysis in plasma-edge studies
[DE84-001578] N84-14004
Hybrid ion diode theory and computations
[DE84-000102] N84-14029

ION CURRENTS
Principles of superionic conduction
[DE84-001215] N84-14044

ION DISTRIBUTION
Calculation of ion charge-state distribution in ECR ion sources
[DE84-000517] N84-13957

ION IMPLANTATION
Reduction of tritium permeation through iron using aluminum-ion implantation
[DE84-000184] N84-13279
Measurement of friction and wear on modified surfaces
[AD-A132364] N84-13583
X-ray and backscattering analysis of ion implantation phenomena in GaAs and related compounds
[AD-A132429] N84-14038
Solid-State Division
[DE84-000296] N84-14045

ION SOURCES
The Marshall Space Flight Center Low-Energy Ion Facility: A preliminary report
[NASA-TM-82559] N84-13933
Calculation of ion charge-state distribution in ECR ion sources
[DE84-000517] N84-13957
Analysis of mechanisms for anode plasma formation in ion diodes
[DE83-017793] N84-14010
Overview of ion-diode research
[DE83-017791] N84-14012
Hybrid ion diode theory and computations
[DE84-000102] N84-14029

ION TRAPS (INSTRUMENTATION)
Steady-state hydrogen transport in solids exposed to fusion-reactor plasmas. Part 3: Applications of theory
[DE84-001646] N84-14033

IONIC CRYSTALS
Fourth Europhysical Conference on Lattice Defects in Ionic Crystals
[AD-A132387] N84-14039

IONIC DIFFUSION
Ambipolarity and transport with resonant ion diffusion in EBT
[DE84-000333] N84-14000

IONIC REACTIONS
Investigation of the dynamics and threshold behavior of endothermic r.egative ion-neutral reactions
[DE84-001369] N84-13975

IONIZATION
Electron-drift velocity and ionization and attachment coefficients in gases/mixtures for diffuse-discharge opening switches
[DE83-017206] N84-14017
Ionization equilibrium in isolated H 2 regions N84-14086

IONIZATION CHAMBERS
Recommended values of the humidity correction factor k sub h for determining exposure in an X-ray beam with free-air chambers
[JEN-542] N84-13915

IONIZATION POTENTIALS
Predicting the base phase in the crystallization of eutectic alloys
[BLL-M-35347-(5828.4)] N84-13262

IONOSPHERIC COMPOSITION
A study of the charged particle calibration requirements for the Deep Space Network N84-13414

IONOSPHERIC DRIFT
Studies of ions in a drift field: Laser diagnostics of excited states and measurements of thermochemical properties at equilibrium
[DE84-000363] N84-13562

IONOSPHERIC ELECTRON DENSITY
A study of the charged particle calibration requirements for the Deep Space Network N84-13414

IONS
Cobalt ion-containing epoxies
[NASA-TM-85715] N84-13309
Energization of ions by oblique double layers N84-13700
Introduction: Advances and opportunities in cluster research
[DE84-000364] N84-13917
Host-lattice effects in the spin-orbit fine structure of vacancy-trapped electrons
[DE84-000599] N84-14052

IRON
Non-uniformity of elastic micro-deformations in austenitic steels
[BLL-M-35357-(5828.4)] N84-13261
Reduction of tritium permeation through iron using aluminum-ion implantation
[DE84-000184] N84-13279

IRON ALLOYS
Effect of implanted helium on the microstructure and creep properties of ordered (Fe0.49 Ni0.51)V-3 alloys
[DE84-000691] N84-13278

IRRADIATION
Effect of phosphorus on the swelling and precipitation behavior of austenitic stainless steels during irradiation
[DE84-000412] N84-13275
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 3. A model for the effect of titanium addition
[DE84-001296] N84-13281
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 1: Microstructural response to neutron irradiation
[DE84-001298] N84-13283
Radiation-induced phosphorus segregation in austenitic and ferritic alloys
[DE84-000903] N84-13302
Dislocation/obstacle interactions during low-dose irradiation creep of nickel
[DE84-001416] N84-13303
Pulsed-ion-irradiated microstructures in molybdenum
[DE84-000679] N84-13304
Structural performance of ceramics in a high-fluence fusion environment
[DE84-001311] N84-13329
Miniaturized disk bend tests of neutron-irradiated path A type alloys
[DE84-001277] N84-13618
Study of defects produced in tungsten by 800-MeV protons using field-ion microscopy
[DE84-001359] N84-14048

IRREGULARITIES
Observations and theory of irregularities of middle latitude sporadic E layers N84-13703

ISOTHERMS
Baroclinic Rossby wave signature in a general circulation ocean model
[AD-A132219] N84-13750

ISOTOPE SEPARATION
Separated isotopes: Vital tools for science and medicine
[DE83-011646] N84-13981

ITERATION
On the Fatou set of monic polynomials N84-13788
Application of the implicit Fourier-expansion method to the calculation of three-dimension equilibria by the iterative method
[DE83-017621] N84-13902

ITERATIVE SOLUTION
Specification for a Program for an Interative Aeroelastic Solution (PIAS)
[NASA-CR-172200] N84-13153
Application of the implicit Fourier-expansion method to the calculation of three-dimension equilibria by the iterative method
[DE83-017621] N84-13902

J

JET AIRCRAFT NOISE
Inverted velocity profile semi-annular nozzle jet exhaust noise experiments
[NASA-TM-83525] N84-13924

JET EXHAUST
Thrust-induced effects on subsonic longitudinal aerodynamic characteristics of a vectored-engine-over-wing configuration
[NASA-TP-2228] N84-13163

JET MIXING FLOW
Investigation of axisymmetric confined turbulent jet mixing in the near region with adverse pressure gradient N84-13148

JETS
An analysis of the interaction between a submerged jet and a receiver-diffuser in a reverse-flow diverter
[DE83-012593] N84-13521

JETTISON SYSTEMS
Crash Position Indicator/Crash Survivable Flight Data Recorder ejectable versus nonejectable
[AD-A132329] N84-13184

JFET
The BJT-JFET: A novel merged device structure
[AD-A132373] N84-13454

JOINTS (JUNCTIONS)
Improving the fatigue performance of thick aluminum alloy bolted joints by hole cold-expansion and the use of interference-fit steel bushes
[ARL-STRUC-NOTE-486] N84-13578
Theoretical basis for design of thermal-stress-free fasteners
[NASA-TP-2226] N84-13614

JOSEPHSON JUNCTIONS
Is it superconductivity at 293 k?
[AD-A132545] N84-14037

JP-4 JET FUEL
Determination of a jet fuel metal deactivator by high performance liquid chromatography
[AD-A132220] N84-13336

JUDGMENTS
External versus intuitive reasoning: The conjunction fallacy in probability judgment
[AD-A131801] N84-13778

JUNCTION TRANSISTORS
A rectangular gate merged MOSBJT
[AD-A132450] N84-13453
Numerical modeling of the MOSBJT
[AD-A132351] N84-13456

JUPITER ATMOSPHERE
Radiative transfer and photochemistry in the upper atmosphere of Jupiter N84-14095

K

KANSAS
A simulation study of scene confusion factors in sensing soil moisture from orbital radar
[E84-10042] N84-13635

KAON PRODUCTION
Problems and prospects in strange baryon spectroscopy
[DE83-018119] N84-13253

KEVLAR (TRADEMARK)
Continuous plasma treatment and resin impregnation of a high-strength fiber material
[DE84-000314] N84-13229
Statistical analysis of Kevlar 49/epoxy composite stress-rupture data
[DE84-000516] N84-13230

KINEMATICS
Kinematic equations for resolved-rate control of an industrial robot arm
[NASA-TM-85665] N84-13866

KINETIC ENERGY
Measurement of friction and wear on modified surfaces
[AD-A132364] N84-13583
Energization of ions by oblique double layers N84-13700
Winter currents on the eastern Bering Sea shelf
[PB83-248823] N84-13753

KNOBS
Temperature rise of handles and knobs
[BLL-OA-TRANS-3047-(6196.3)] N84-13502

KRIGING
Kriging of geological and physical parameters from Yucca Flat, NTS
[DE83-018227] N84-13625

L

LAKES
Dissolved organic matter and lake metabolism: Biochemistry and controls of nutrient flux dynamics in lakes
[DE83-016789] N84-13761

LAMINAR BOUNDARY LAYER
Investigation of the wall pressure, wall shear stress and velocity fields associated with a turbulent spot in a laminar boundary layer N84-13488
Embedded cavity drag in steady and unsteady flows
[NASA-CR-172275] N84-13493

LAMINAR FLOW
Response of flame spread phenomena to ambient air stream velocity changes N84-13373
Finite-element analysis of incompressible laminar and turbulent flow with heat transfer
[DE84-000042] N84-13523

LAMINATES
The mechanics of delamination in fiber-reinforced composite materials. Part 1: Stress singularities and solution structure
[NASA-CR-172269] N84-13221
The mechanics of delamination in fiber-reinforced composite materials. Part 2: Delamination behavior and fracture mechanics parameters
[NASA-CR-172270] N84-13222

LAND USE
The United Kingdom SATMaP program
[E84-10002] N84-13627
The use of thematic mapper data for land cover discrimination: Preliminary results from the UK SATMaP programme
[E84-10038] N84-13631
Photo interpretation key to Michigan land cover/use
[E84-10048] N84-13641
The hardwood resource on nonindustrial private forest land in the southeast Piedmont
[PB83-252759] N84-13663
Forest area and timber resource statistcs for state and private lands in New Mexico, 1980, Forest Service resource bulletin
[PB83-251157] N84-13667
LANDSAT SATELLITES
Spatial filtering for enhancing point targets in images from a space-based mosaic IR detector
[AD-A132248] N84-13425
Deforestation measured by LANDSAT: Steps toward a method
[DE83-016645] N84-13652
A satellite study of ocean internal waves
[PB83-248708] N84-13661
LANDSAT 4
Information content of data from the LANDSAT 4 Thematic Mapper (TM) and multispectral scanner (MSS)
[E84-10034] N84-13628
LANDSAT 4 image data quality analysis
[E84-10036] N84-13629
The use of linear feature detection to investigate thematic mapper data performance and processing
[E84-10037] N84-13630
The use of thematic mapper data for land cover discrimination: Preliminary results from the UK SATMaP programme
[E84-10038] N84-13631
Comparative assessment of LANDSAT-4 MSS and TM data quality for mapping applications in the southeast
[E84-10040] N84-13633
Analysis of the quality of image data acquired by the LANDSAT-4 Thematic Mapper (TM) of the Black Hills area, South Dakota
[E84-10041] N84-13634
Analysis of multispectral scanner (MSS) and Thematic Mapper (TM) performance (pre-launch and post-launch)
[E84-10043] N84-13636
In-flight absolute radiometric calibration of the thematic mapper
[E84-10044] N84-13637
Spectroradiometric calibration of the thematic mapper and multispectral scanner system
[E84-10045] N84-13638
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E84-10050] N84-13643
LANGUAGES
Short introduction to office applications of markup language
[DE83-011400] N84-13844
LAPLACE TRANSFORMATION
Positive biharmonic functions N84-13786
LARGE SPACE STRUCTURES
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(09)] N84-13204
Analysis of large space structures assembly: Man/machine assembly analysis
[NASA-CR-3751] N84-13208
Study of auxiliary propulsion requirements for large space systems, volume 2
[NAA-CR-166193] N84-13218
LARMOR RADIUS
Linear relativistic gyrokinetic equation in general magnetically confined plasmas
[DE84-000048] N84-14027
LASER APPLICATIONS
Measurement of thermal conductivity from high-temperature pulse diffusivity and calorimetry measurements
[DE84-000353] N84-13297
LASER DOPPLER VELOCIMETERS
Measurement of velocity distributions in turbulent jets using a laser Doppler velocimeter
[AD-A132316] N84-13506
LASER FUSION
A laser-fusion rocket for interplanetary propulsion
[DE84-001238] N84-13219
NOVANET: Communications network for a control system
[DE83-013862] N84-13436
Measuring the neutron energy spectrum of laser-fusion targets with CR-39
[DE84-001422] N84-13543
Simulations and theoretical implications of KMS transport experiments for 1.05 micron and 0.53 micron laser radiation
[DE84-000824] N84-13570
LASER HEATING
Preparation of infrared optic fibers using new materials
[AD-A132311] N84-13988
LASER MATERIALS
NdP5O14 crystal used for miniature rangefinder
[AD-A132541] N84-13549
LASER OUTPUTS
Dissociative ionization of liquid water induced by vibrational overtone excitation
[DE83-017739] N84-13251
High energy efficient solid state laser sources — slab geometry laser sources
[NASA-CR-174806] N84-13548
Laser-induced fluorescence line narrowing in atomic vapors
[DE83-018216] N84-13558
Studies of ions in a drift field: Laser diagnostics of excited states and measurements of thermochemical properties at equilibrium
[DE84-000363] N84-13562
Particle velocity measurements in laser irradiated foils using ORVIS
[DE83-016629] N84-13563
Narrow-band, near-UV, high-repetition-rate laser-induced fluorescence system for use as an dge diagnostic in fusion machine
[DE84-000586] N84-13567
LASER PLASMAS
New concepts in particle acceleration
[DE83-017747] N84-13961
LASER RANGE FINDERS
NdP5O14 crystal used for miniature rangefinder
[AD-A132541] N84-13549
LASER SPECTROSCOPY
Laser-induced fluoreacence spectroscopy for improved chemical analysis
[DE84-000629] N84-13243
Approach to single-molecule detection by laser-induced fluorescence
[DE84-001338] N84-13572
Instrumentation for remote sensing over fiber optics
[DE84-001788] N84-13991
LASER TARGETS
A laser-fusion rocket for interplanetary propulsion
[DE84-001238] N84-13219
Measuring the neutron energy spectrum of laser-fusion targets with CR-39
[DE84-001422] N84-13543
Laser-plasma interaction at 10.6 microns
[DE84-001038] N84-13560
Particle velocity measurements in laser irradiated foils using ORVIS
[DE83-016629] N84-13563
Vortex shedding and laser ablation
[DE84-000301] N84-13565
Simulations and theoretical implications of KMS transport experiments for 1.05 micron and 0.53 micron laser radiation
[DE84-000824] N84-13570
Investigation of soft X-ray reflective coatings
[DE84-000510] N84-14025
LASER WELDING
Component temperature versus laser-welding parameters
[DE84-000362] N84-13559
Development of recuperator manufacturing techniques, phase 2
[AD-A132448] N84-13581
Thermal modeling of laser welding with a quasi-1-dimensional approach
[DE84-001292] N84-13585
LASERS
Large laser system facility design
[DE84-000159] N84-13553
Analysis of stability and symmetry implications for ICF
[DE84-000640] N84-13556
LATTICE PARAMETERS
Host-lattice effects in the spin-orbit fine structure of vacancy-trapped electrons
[DE84-000599] N84-14052
LAYOUTS
Planar embedding of planar graphs
[AD-A132538] N84-13820
LEAD ACID BATTERIES
Research, development and demonstration of lead-acid batteries for electric vehicle propulsion
[DE84-000468] N84-13464
Application features and considerations in advanced lead-acid and nickel/iron EV batteries
[DE83-017936] N84-13472
LEARNING CURVES
A general framework for learning curve reliability growth models
[AD-A132277] N84-13596
LEAST SQUARES METHOD
Quantitative determination of the intensities of known components in spectra obtained from surface analytical techniques
[DE84-000926] N84-13239
Relationships between strength, electrical conductivity, and density for oxidized PGX graphite
[DE83-016184] N84-13325
LEPTONS
Double beta decay: Recent developments and projections
[DE84-000476] N84-13944
LIBRARIES
Fiber composite materials research in the UK: Assessment report
[AD-A132386] N84-13226
Computer software summaries, numbers 424 through 693
[DE83-015297] N84-13834
LIFE (DURABILITY)
Glass fibre/epoxy resin interface life-time prediction
[AD-A132206] N84-13320
Calculation of the life of components of metallurgical equipment from the parameter of failure probability
[BLL-M-35351-(5828.4F)] N84-13594
LIGHT (VISIBLE RADIATION)
White light signal processing with the application to spread spectrum communications
[AD-A132418] N84-13417
LIGHT TRANSMISSION
Field maintenance of radiation-shielding windows at HFEF
[DE83-015376] N84-13326
Calculation of atmospheric transmittance by IBM 3033 computer code LOWTRAN IIIB
[AD-A132123] N84-13989
LIGHTNING
China builds first 6000kV type pulse voltage generator
[AD-A132564] N84-13449
Lightning mapping sensor study
[NASA-CR-170908] N84-13731
Lightning mapper sensor design study
[NASA-CR-170909] N84-13732
The 1980 International Aerospace Conference on Lightning and Static Electricity
[CSIR-ELEK-249] N84-13733
LIMESTONE
Stress-wave experiments on selected crustal rocks and minerals
[DE84-001613] N84-13714
LIMITERS (FUSION REACTORS)
Materials needs for compact fusion reactors
[DE84-001366] N84-14031
Plasma/neutral gas transport in divertors and limiters
[DE84-001594] N84-14034
LIMITS (MATHEMATICS)
On the Harnack constant and the boundary behavior of Harnack functions N84-13796
LIMNOLOGY
Dissolved organic matter and lake metabolism: Biochemistry and controls of nutrient flux dynamics in lakes
[DE83-016789] N84-13761
LINE SHAPE
Liouvillian Green's-function theory of spectral line shape
[AD-A132467] N84-13894
LINE SPECTRA
Liouvillian Green's-function theory of spectral line shape
[AD-A132467] N84-13894
Studies of cataclysmic variables N84-14084
LINEAR ACCELERATORS
Low-inductance, dual-feed diode development
[DE84-000117] N84-13465
Beam dynamics in the Advanced Test Accelerator (ATA)
[DE84-001421] N84-13947
Surface properties of metal-nitride and metal-carbide films deposited on Nb for RF superconductivity
[DE84-001491] N84-14055
LINEAR EQUATIONS
Acoustic-gravity wave dispersion relations in a baroclinic atmosphere
[PB83-248690] N84-13726
Application of the implicit Fourier-expansion method to the calculation of three-dimension equilibria by the iterative method
[DE83-017621] N84-13902
LINEAR PREDICTION
Adaptive spectral smoothing
[AD-A132574] N84-13887

LINEAR SYSTEMS
Application of pseudoinversion to linear system identification with discrete measurements
[AD-A132283] N84-13422
LINEARITY
Design of a high-brightness, low-jitter, short-pulse laser for plasma diagnostics
[DE84-000129] N84-13564
LIPSCHITZ CONDITION
On some extensions of a theorem of Hardy and Littlewood N84-13784
LIQUID CHROMATOGRAPHY
Determination of a jet fuel metal deactivator by high performance liquid chromatography
[AD-A132220] N84-13336
LIQUID CRYSTALS
Far infrared studies on superconductors and heat-capacity studies on liquid crystals
[DE84-001105] N84-14046
LIQUID HELIUM
Heat transfer to subcooled HE 1
[DE83-017767] N84-13520
LIQUID METALS
Predicting the base phase in the crystallization of eutectic alloys
[BLL-M-35347-(5828.4)] N84-13262
LIQUID PHASES
Phase and compression behavior in sedimentation and thickening of liquid-solid suspensions
[PB83-249664] N84-13257
LIQUID ROCKET PROPELLANTS
Weightlessness and management of liquid rocket propellant
[AD-A132516] N84-13334
LIQUID SURFACES
Thermodynamic surface for water: The formulation and computer programs
[PB83-249789] N84-13256
LIQUID WASTES
A guide for effluent radiological measurements at DOE installations
[DE83-016639] N84-13542
LIQUID-SOLID INTERFACES
Formation of structure of low-alloy steel inoculated with rare-earth metals and alkaline-earth metals
[BLL-M-35321] N84-13258
LIQUIDS
Molecular basis for local compositions in liquid-mixture models
[DE83-016604] N84-13250
Dissociative ionization of liquid water induced by vibrational overtone excitation
[DE83-017739] N84-13251
Prediction of multicomponent liquid-mixture viscosity from binary thermodynamic data
[DE83-011934] N84-13524
Penetrant and magnetic-particle inspection for material integrity
[DE83-017830] N84-13600
LITHIUM
Mass transfer behavior of a modified austenitic stainless steel in lithium
[DE84-000338] N84-13293
Influence of a flowing-lithium environment on the fatigue and tensile properties of type 316 stainless steel
[DE84-000611] N84-13295
LITHIUM CHLORIDES
Safety studies on Li/SOCl-2 reserve battery
[AD-A132279] N84-13458
LITHIUM COMPOUNDS
Performance test results of an absorption heat pump which is designed to utilize low-temperature 600C (1400F) industrial waste heat
[DE83-017194] N84-13533
LITHIUM SULFUR BATTERIES
International Meeting on Lithium Batteries
[AD-A132371] N84-13455
LIVESTOCK
Evaluating proposed improvements of public rangelands
[PB83-251124] N84-13669
LOADS (FORCES)
Preliminary results of the first static calibration of the RSRA helicopter active-isolator rotor balance system
[NASA-TM-84395] N84-13178
LOGIC DESIGN
Logic design of a shared disk system in a multi-micro computer environment
[AD-A132165] N84-13862
LOGISTICS MANAGEMENT
Integrated logistic supportability (Aviation materiel)
[AD-A132367] N84-13146
LONGITUDINAL STABILITY
Power effects on the longitudinal characteristics on single-engine propeller-driven aircraft
[ARL-AERO-REPT-157] N84-13174
LOOPS
The MHD stability of inertia-tied Z-pinches with application to solar coronal loops N84-13932
Loop coalescence in flares and coronal X-ray brightening
[DE83-013070] N84-14099
LOUDSPEAKERS
A study on sound guidance for evacuation: Effect of megaphoned evacuation guidance in smoke N84-13356
Optical methods of measuring loudspeaker diaphragm movement
[BBC-RD-1983/13] N84-13396
LOW LEVEL TURBULENCE
Statistical analysis of turbulence data from the NASA Marshall Space Flight Center atmospheric boundary layer tower array facility — statistical correlations for aircraft design
[NASA-CR-3737] N84-13730
LOW NOISE
L band low noise amplifier project
[INPE-2794-PRE/356] N84-13445
Computer-aided synthesis and design of monolithic microwave GaAs MESFET amplifiers
[AD-A132474] N84-13452
Low-noise gallium-arsenide field-effect transistor preamplifiers for stochastic beam-cooling systems
[DE83-017535] N84-13475
LOW PRESSURE
Observations of nonlinear behavior in a low-pressure discharge column
[AD-A132321] N84-13996
LOW TEMPERATURE PHYSICS
Is it superconductivity at 293 k?
[AD-A132545] N84-14037
LUBRICATING OILS
Storage of synthetic turbine lubricants under adverse conditions
[AD-A132226] N84-13319
LUBRICATION
Surface contact wear and abrasive wear in lubricated sliding mechanisms N84-13573
LUMINOSITY
Soft X-ray spectral observations of quasars and high X-ray luminosity Seyfert galaxies
[NASA-TM-85118] N84-14082
LYRAE CONSTELLATION
The effect of opacity on theoretical models of RR Lyrae stars N84-14081

M

MACH NUMBER
Aerodynamic characteristics, including effect of body shape, of a Mach 6 aircraft concept
[NASA-TP-2235] N84-13164
MACHINE TOOLS
Extrusion. State of the art and development, review paper
[RAE-TRANS-2102] N84-13381
Coordinate-measuring machine capability
[DE84-002014] N84-13544
MAGNETIC ANOMALIES
Interpretation of aeromagnetic anomalies of the Quadrilatero Ferrifero region
[INPE-2897-PRE/416] N84-13707
MAGNETIC COILS
Locally omnigenous tandem-mirror design
[DE84-001605] N84-14007
MAGNETIC COOLING
Low-hysteresis materials for magnetic refrigeration: Gd sub 1-x/Er sub x/Al2
[DE84-001685] N84-13307
MAGNETIC DISKS
Logic design of a shared disk system in a multi-micro computer environment
[AD-A132165] N84-13862
MAGNETIC FIELD CONFIGURATIONS
Energetic plasma-beam propagation in weak and strong magnetic fields
[DE84-001362] N84-14005
Energetic-particle stabilization of ballooning modes in Tokamaks
[DE83-016205] N84-14020
Study on diffusion of the vertical magnetic field in the toroidal stabilizing shell of the ZT-40M reversed-field-pinch device
[DE83-016353] N84-14023
Linear relativistic gyrokinetic equation in general magnetically confined plasmas
[DE84-000048] N84-14027
MAGNETIC FIELDS
Ideal of the perfect magnet-superconducting systems
[DE83-015080] N84-13482
Energization of ions by oblique double layers N84-13700
Locally omnigenous tandem-mirror design
[DE84-001605] N84-14007
Hybrid ion diode theory and computations
[DE84-000102] N84-14029
MAGNETIC MIRRORS
Construction and operational experience of the tandem mirror experiment-upgrade (TMX-U)
[DE83-018181] N84-13995
Locally omnigenous tandem-mirror design
[DE84-001605] N84-14007
Evolution of the mirror machine
[DE83-016942] N84-14009
TMX-U diagnostic system
[DE83-017834] N84-14015
MAGNETIC PROPERTIES
Penetrant and magnetic-particle inspection for material integrity
[DE83-017830] N84-13600
Magnetic properties of Mo/Ni superlattices
[DE84-000568] N84-14053
MAGNETIC SPECTROSCOPY
Neutrino-oscillation experiments at Brookhaven National Laboratory
[DE83-018275] N84-13476
Direct measurement of the energy spectrum of an intense proton beam
[DE84-000457] N84-13939
MAGNETIC STORAGE
Theoretical modeling of the plasma-erosion opening switch for inductive-storage applications
[DE84-001843] N84-13483
MAGNETIC TAPES
A program for the automatic request of magnetic tapes filing and reading of its contents (processor PCINTA)
[JEN-545] N84-13815
MAGNETOHYDRODYNAMIC STABILITY
Introduction: Advances and opportunities in cluster research
[DE84-000364] N84-13917
The MHD stability of inertia-tied Z-pinches with application to solar coronal loops N84-13932
Simulation studies on a novel betatron injection scheme
[DE84-001337] N84-13946
Space-time evolution of the nonlinear 2-stream instability
[DE84-001336] N84-13950
Filamentation instability of ion acoustic waves driven by a scattered relativistic beam
[DE84-001323] N84-13956
Construction and operational experience of the tandem mirror experiment-upgrade (TMX-U)
[DE83-018181] N84-13995
Observations of nonlinear behavior in a low-pressure discharge column
[AD-A132321] N84-13996
Resonant-3-wave mode coupling in inhomogeneous plasmas: Symmetry breaking by omega meson-*
[DE84-001633] N84-13999
Simulations of the effects of mobile ions on the relativistic beam-plasma instability for intense beams
[DE84-000369] N84-14003
High-density Z-pinch research
[DE83-017311] N84-14013
TMX-U diagnostic system
[DE83-017834] N84-14015
Hamiltonian formulation of reduced magnetohydrodynamics
[DE83-016758] N84-14021
Nonlinear kinetic theory of a single helicity tearing instability
[DE84-000049] N84-14024
MAGNETOHYDRODYNAMICS
Inverse plasma equilibria
[DE84-000723] N84-14006
MAGNETOSPHERE
An analysis of pC-3 micropulsion in the geomagnetic field
[AD-A132443] N84-13709
MAGNETS
Study and review of permanent magnets for electric vehicle propulsion motors
[NASA-CR-168178] N84-14071
MAGNONS
Magnetic properties of Mo/Ni superlattices
[DE84-000568] N84-14053
MAIN SEQUENCE STARS
A study of the empirical mass-luminosity diagram for early type stars N84-14075
MAINTENANCE
Integrated logistic supportability (Aviation materiel)
[AD-A132367] N84-13146

Flight service evaluation of advanced composite ailerons on the L-1011 transport aircraft
[NASA-CR-172246] N84-13223
Field maintenance of radiation-shielding windows at HFEF
[DE83-015376] N84-13326
Detection of cracks on highway pavements
[PB83-238204] N84-13389
Techniques of condition monitoring and fault diagnosis in industry N84-13595

MALES
Adaptations to a high fat diet which increase exercise endurance in male rats N84-13755

MAMMALS
The effects of hyperbaric elemental gases on the rate coefficient of K(+) influx in mammalian synaptosomes N84-13754
Four frames suffice. A provisionary model of vision and space
[AD-A132359] N84-13825

MAN MACHINE SYSTEMS
Analysis of large space structures assembly: Man/machine assembly analysis
[NASA-CR-3751] N84-13208

MANAGEMENT INFORMATION SYSTEMS
Knowledge base management for model management systems
[AD-A132211] N84-14062

MANAGEMENT METHODS
Weightlessness and management of liquid rocket propellant
[AD-A132516] N84-13334
The Nova laser assurance-management system
[DE83-018188] N84-13568
Formal techniques in the management of software design
[AD-A132569] N84-13818

MANAGEMENT PLANNING
Evaluating proposed improvements of public rangelands
[PB83-251124] N84-13669

MANAGEMENT SYSTEMS
Design and implementation of a BASIC cross-compiler and virtual memory management system for the TI-59 programmable calculator
[AD-A132172] N84-13808

MANGANESE ALLOYS
A comparison of the irradiated tensile properties of a high-manganese austenitic steel and type 316 stainless steel
[DE84-000260] N84-13294
Copper-manganese-base silverless brazing systems
[PB83-250100] N84-13593

MANIFOLDS (MATHEMATICS)
On the structure of self-similar fractals N84-13791
Great sphere fibrations of manifolds
[AD-A132544] N84-13888

MANUFACTURING
Development of recuperator manufacturing techniques, phase 2
[AD-A132448] N84-13581

MANY BODY PROBLEM
The 3-body forces, relativistic effects, isobars, and pions in nuclear systems
[DE84-000163] N84-13938

MAPPING
Comparative assessment of LANDSAT-4 MSS and TM data quality for mapping applications in the southeast
[E84-10040] N84-13633
Automated standard nautical chart production
[AD-A132249] N84-13644
Lightning mapping sensor study
[NASA-CR-170908] N84-13731
Lightning mapper sensor design study
[NASA-CR-170909] N84-13732
Satellite observations of variations in southern hemisphere snow cover
[PB83-252908] N84-13745

MARINE ENVIRONMENTS
Impact of enhanced solar UV-B radiation upon the marine ecosystem
[PB83-247411] N84-13694

MARINE METEOROLOGY
Data validation and summary for the NRL remote sensing experiment: Phelps Bank, July, 1982. Part 2: Meteorology
[AD-A132105] N84-13646
Quasi-Lagrangian diagnostics applied to an extratropical explosive cyclogenesis in the North Pacific
[AD-A132213] N84-13741

MARINE TECHNOLOGY
Research activities that occurred in the Coordinated Science Laboratory for July 1, 1982 through Jun 30, 1983
[AD-A132132] N84-14108

MARKOV PROCESSES
Using simulation to estimate first passage distributions
[AD-A132326] N84-13898

MARS (PLANET)
Baroclinic waves in the atmosphere of Mars: Observations, linear instability, and finite-amplitude evolution N84-14094

MARTENSITE
Dilatometric investigation of phase-transformation kinetics in HP 9-4-20 steel
[DE84-001180] N84-13280
The relationship between the martensitic phase transition and the superconducting properties of A15 compounds
[DE83-018186] N84-13477

MASERS
An EPROM-based function generator N84-13408

MASS
Neutrino-oscillation experiments at Brookhaven National Laboratory
[DE83-018275] N84-13476

MASS BALANCE
Dynamic mass balance of PCB (polychlorinated biphenyls) and suspended solids in Saginaw Bay: A case study
[PB83-250308] N84-13699

MASS FLOW
Two-dimensional accretion disk structure and stability N84-14090

MASS SPECTROSCOPY
Evaluation of non-intrusive flow measurement techniques for a re-entry flight experiment
[NASA-CR-172142] N84-13212
Characterization of high-temperature vapor-phase species and vapor-solid interactions of import to combustion and gasification processes in the energy technologies
[DE83-015166] N84-13242

MASS TRANSFER
Development of multicomponent transport theory and transport data for membranes in concentrated electrolytes
[DE84-001846] N84-13249
Mass transfer behavior of a modified austenitic stainless steel in lithium
[DE84-000338] N84-13293
Studies of cataclysmic variables N84-14084

MATERIALS
Photovoltaic-cell-reseach priorities
[DE84-000066] N84-13683

MATERIALS HANDLING
Automatic sprinklers N84-13346
Hydraulic hoisting and backfilling
[CSIR-ME-452] N84-13498
Introduction to flexible manufacturing systems: Their applications, classification, and opportunities
[DE83-017373] N84-13868

MATHEMATICAL LOGIC
Vectorizing and machine-spanning techniques
[DE84-000469] N84-13810

MATHEMATICAL MODELS
Phase and compression behavior in sedimentation and thickening of liquid-solid suspensions
[PB83-249664] N84-13257
Effective-width model for evacuation flow N84-13362
Modeling of compartment fires N84-13364
New modeling of compartment fires and problem of flashover N84-13365
Similarity analysis of the flow characteristics in diffusion flames N84-13367
Electrical and thermal modeling of railguns
[DE84-001361] N84-13387
Deformable subreflector computed by geometric optics N84-13407
Phase locked loop theory and application: A precis paper
[CSIR-NIAST-82/57] N84-13444
The BJT-JFET: A novel merged device structure
[AD-A132373] N84-13454
Temperature rise of handles and knobs
[BLL-OA-TRANS-3047-(6196.3)] N84-13502
Prediction of multicomponent liquid-mixture viscosity from binary thermodynamic data
[DE83-011934] N84-13524
The 1982 International Congress of Photographic Science
[AD-A132372] N84-13536
A general framework for learning curve reliability growth models
[AD-A132277] N84-13596
Mathematical models of nonlinear galvanic polarization
[AD-A132403] N84-13895
The measurement of elastic constants for the determination of stresses by X-rays
[AD-A132330] N84-13897
The Crab Nebula: A theoretical and observational study N84-14074

MATRICES (MATHEMATICS)
A solution technique for complex matrix games
[ARL-SYS-NOTE-83] N84-13910

MATRIX MATERIALS
Overview of composites capability at Lawrence Livermore National Laboratory
[DE84-001086] N84-13228

MAXIMUM LIKELIHOOD ESTIMATES
On a relation between Maximum-Likelihood classification and Minimum-Cross-Entropy classification
[AD-A132237] N84-13426
Estimation of the Manova eigenvalues under the random effects model
[CSIR-TWISK-271] N84-13877

MAXIMUM PRINCIPLE
Restricted maximum principles for elastic bodies
[NASA-CR-172255] N84-13609

MEAN
Invariant means on semi-topological transformation semigroups N84-13912

MEASURE AND INTEGRATION
Generalized composite integration rules in the presence of a singularity
[CSIR-TWISK-272] N84-13876

MEASURING INSTRUMENTS
Automated thermal conductivity probe and applications to powders
[DE84-000451] N84-13328
Technology assessment: 1983 forecast of future test technology requirements
[AD-A132421] N84-14107

MECHANICAL DEVICES
Methods of optimizing parameters of mechanisms performing repeated brief operations
[BLL-M-35352] N84-13575
Modelling of submerged cable dynamics
[AD-A132495] N84-13580

MECHANICAL DRIVES
The FASTBUS segment driver microcode description
[DE83-017972] N84-13437

MECHANICAL ENGINEERING
Investigation in the application of computer-aided process-planning techniques for mechanical engineering at Bendix Kansas City
[DE84-000302] N84-13842

MECHANICAL MEASUREMENT
Absolute determination of stress in textured materials
[DE83-018083] N84-13621

MECHANICAL PROPERTIES
Modelling the behavior of materials
[DE84-000154] N84-13588
Approximate solution of the problem of thermoelasticity of a sphere with variable properties
[BLL-M-35369-(5828.4F)] N84-13606

MELTING
Thermal modeling of laser welding with a quasi-1-dimensional approach
[DE84-001292] N84-13585

MEMBRANE STRUCTURES
Stream-water storage in the ocean using an impermeable membrane
[PB83-248369] N84-13394

MEMBRANES
Development of multicomponent transport theory and transport data for membranes in concentrated electrolytes
[DE84-001846] N84-13249
Battery transport data
[DE84-001640] N84-13462
The effects of hyperbaric elemental gases on the rate coefficient of K(+) influx in mammalian synaptosomes N84-13754
Kinetic and spectroscopic studies of cytochrome b-563 in isolated cytochrome b/f complex and in thylakoid membranes
[DE83-017982] N84-13760

MEMORY
Four frames suffice. A provisionary model of vision and space
[AD-A132359] N84-13825
Time series long memory identification and quantile spectral analysis
[AD-A132240] N84-13900

MEMORY (COMPUTERS)
Detailed introduction and reference manual for: The network-shared-memory distributed database system
[DE83-017547] N84-13865

MEROMORPHIC FUNCTIONS
The specific solutions of a uniform algebraic differential equation of the second order
[ISSN-0066-1953] N84-13783
On the growth of the spherical derivative of a meromorphic function N84-13785

Functions of uniformly bounded characteristic
[N84-13802]

MESONS
Meson-exchange Hamiltonian for NN scattering and isobar-nucleus dynamics
[DE83-017974] N84-13959

MESOSCALE PHENOMENA
Analytical investigation of meso-scale boundary layer forced by surface temperature variation in a stratified sheared atmosphere N84-13702
Precipitation development in midlatitude cyclones: A study of cloud structures and processes N84-13728
A numerical study of cloud and precipitation processes in mesoscale rainbands N84-13729
A position paper: Mesoscale oceanography from GEOSAT
[AD-A132292] N84-13749

METAL COATINGS
Chemical conversion surfaces for solar-energy applications
[DE84-000107] N84-13681

METAL FATIGUE
Influence of a flowing-lithium environment on the fatigue and tensile properties of type 316 stainless steel
[DE84-000611] N84-13295

METAL OXIDE SEMICONDUCTORS
A rectangular gate merged MOSBJT
[AD-A132450] N84-13453
The BJT-JFET: A novel merged device structure
[AD-A132373] N84-13454

METAL POWDER
Wear during rubbing of a sintered metal powder body
[AD-A132354] N84-13584

METAL SURFACES
Photo-induced field emissions from metallic surfaces
[DE84-000872] N84-13966

METAL WORKING
Extrusion. State of the art and development, review paper
[RAE-TRANS-2102] N84-13381

METAL-NITRIDE-OXIDE-SILICON
ESD evaluation of radiation-hardened, high-reliability CMOS and MNOS ICs
[DE84-000138] N84-13481

METALLIC GLASSES
Density of occupied d states in transition metal-metalloid metallic glasses
[DE84-001206] N84-13298
EXAFS study of Metglas 2605 CO
[DE84-001203] N84-13299

METALS
Sizing defects using annular-array techniques with an automated ultrasonic data-acquisition system
[DE84-001644] N84-13597
Absolute determination of stress in textured materials
[DE83-016083] N84-13621
Fate and effects of metals in the sea-surface microlayer
[DE84-000114] N84-13752

METEORITIC COMPOSITION
Microprobe analyses of rare-earth-element fractionation in meteoritic minerals
[DE83-017326] N84-14097

METEOROLOGICAL PARAMETERS
An analysis of cloud cover at Johannesburg, Cape Town and Durban, in South Africa
[CSIR-NBRI-SR-BOU-60] N84-13734
Range reference atmosphere 0-70 km altitude
[AD-A132487] N84-13737
Stratified maximum temperature relationships between sixteen zone stations in Arizona and respective key stations
[PB83-249904] N84-13746

METEOROLOGICAL SATELLITES
Satellite activities of NOAA (National Environmental Satellite Data and Information Service) 1982
[PB83-252510] N84-13747

METEOROLOGY
Representativeness of meteorological observations
[DE83-017699] N84-13743

METHANATION
Origin of electron-bombardment enhanced reactivity of graphite with hydrogen
[DE83-017561] N84-13960

MICHIGAN
Photo interpretation key to Michigan land cover/use
[E84-10048] N84-13641

MICROANALYSIS
Microprobe analyses of rare-earth-element fractionation in meteoritic minerals
[DE83-017326] N84-14097

MICROCHANNELS
Channel electron multiplier and optically coupled amplifier used as an incident-flux monitor
[DE84-001451] N84-13539

MICROCOMPUTERS
A microcomputer program package of the USAF stability and control DATCOM
[AD-A132143] N84-13199
NRIO microcomputer system
[CSIR-T/SEA-8134] N84-13805
The DJS-054II microcomputer
[AD-A132552] N84-13807
Logic design of a shared disk system in a multi-micro computer environment
[AD-A132165] N84-13862

MICROCRACKS
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-6, 211/November-December 1982
[ESA-TT-801] N84-13382

MICROPROCESSORS
Airborne Intelligent Display (AID) phase 1 software development
[ATC-123] N84-13181
INTAC: A computer-aided test interface
[INPE-2792-TDL/138] N84-13446
Wafer-scale integration of systolic arrays
[AD-A132536] N84-13450
Processor-controlled DAC-20 (digital-to-analog converter)
[AD-A132260] N84-13460
Communicating between the IBM personal computer and the Wang word-processing system
[DE83-017987] N84-13609
Automated design of microprocessor-based digital filters
[AD-A132214] N84-13832
Fast, self-nulling spectroscopic ellipsometer: Instrumentation and application, revision
[DE83-015531] N84-13994

MICROPULSATIONS
An analysis of pC-3 micropulsion in the geomagnetic field
[AD-A132443] N84-13709

MICROSTRUCTURE
Effect of implanted helium on the microstructure and creep properties of ordered (Fe0.49 Ni0.51)V-3 alloys
[DE84-000691] N84-13278
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 2. Dual-ion irradiations
[DE84-001297] N84-13282
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 1: Microstructural response to neutron irradiation
[DE84-001298] N84-13283
Microstructure of 9 Cr-1 MoVNb steel irradiated to 40 dpa at elevated temperatures in HFIR
[DE84-000339] N84-13285
Dislocation/obstacle interactions during low-dose irradiation creep of nickel
[DE84-001416] N84-13303
Pulsed-ion-irradiated microstructures in molybdenum
[DE84-000679] N84-13304
Segregation and domain structure in rapidly solidified Ni3Al
[DE83-017188] N84-13306
Structural performance of ceramics in a high-fluence fusion environment
[DE84-001311] N84-13329

MICROWAVE AMPLIFIERS
Microwave generators: Oscillating virtual cathodes and reflexing electrons
[DE84-001346] N84-13433
Computer-aided synthesis and design of monolithic microwave GaAs MESFET amplifiers
[AD-A132474] N84-13452

MICROWAVES
Microwave monolithic integrated circuit development for future spaceborne phased array antennas
[NASA-TM-83518] N84-13399
A proposed RF-technology R/D plan for the United States
[DE84-000643] N84-13434
Air-breakdown limits for microwave-pulse propagation. Part 1. Experiments
[DE83-017832] N84-13438
Pulsed-power diode generation of high-power microwaves
[DE84-001344] N84-13440
External wave-launcher study
[DE84-001124] N84-13441
Microwave nondestructive evaluation of composites
[DE84-001777] N84-13601

MILITARY TECHNOLOGY
Crash Position Indicator/Crash Survivable Flight Data Recorder ejectable versus nonejectable
[AD-A132329] N84-13184

MILLIMETER WAVES
The 30 GHz communications satellite low noise receiver
[NASA-CR-168254] N84-13398

MINERAL DEPOSITS
Kriging of geological and physical parameters from Yucca Flat, NTS
[DE83-016227] N84-13625

MINES (EXCAVATIONS)
Correlation of LANDSAT and air photo linears with roof control problems and geologic features
[PB83-250852] N84-13656

MINIATURIZATION
NdP5O14 crystal used for miniature rangefinder
[AD-A132541] N84-13549

MINING
Hydraulic hoisting and backfilling
[CSIR-ME-452] N84-13498

MIRROR FUSION
Locally omnigenous tandem-mirror design
[DE84-001605] N84-14007

MIRRORS
Matrix approach to testing mirrors, part 2
[DE83-011996] N84-13676
Investigation of soft X-ray reflective coatings
[DE84-000510] N84-14025

MISSILE CONTROL
Bank-to-turn control
[AD-A132491] N84-13214

MISSILE RANGES
White Sands Missile Range, New Mexico Range reference atmosphere 0-70 km altitude
[AD-A132471] N84-13738

MISSILES
Experimental aerodynamic characteristics of missiles with square cross sections
[AD-A132278] N84-13215

MIXING
Experiments on mixing and combustion with low heat release in a turbulent shear flow N84-13489
Computation of turbulent reacting flows: Comparison of various mixing/chemistry interaction models
[DE84-000998] N84-13514

MIXTURES
Molecular basis for local compositions in liquid-mixture models
[DE83-016604] N84-13250
Investigation of sources, properties and preparation of distillate test fuels
[NASA-CR-168227] N84-13332
Solubility of the NiO fuel-cell cathode in Li2CO3 melts as determined by cyclic voltammetry
[DE83-014311] N84-13485

MOBILITY
Mobility of organic complexes of nickel and cobalt in soils
[DE83-017897] N84-13720

MODELS
Emergency evacuation flow models N84-13360

MODULUS OF ELASTICITY
The measurement of elastic constants for the determination of stresses by X-rays
[AD-A132330] N84-13897

MOIRE FRINGES
Strain analysis of thin composites with Moire method
[NAL-TR-754] N84-13612

MOISTURE
Bound and free moisture in explosives and plastics
[DE84-001402] N84-13339
A composite analysis of a tropical squall-line system N84-13727

MOISTURE CONTENT
Microwave nondestructive evaluation of composites
[DE84-001777] N84-13601
Application of remote sensing to hydrological problems and floods
[E84-10046] N84-13639

MOLECULAR CLOUDS
Large scale galactic shocks and motions of the cloud medium N84-14089

MOLECULAR EXCITATION
Shock induced molecular excitation in solids
[AD-A132236] N84-13935
Simulation of shock-induced energy flux in molecular solids
[DE84-001157] N84-14047

MOLECULAR OSCILLATIONS
Vibrational spectroscopy of chemisorbed molecules by infrared emission
[DE84-000956] N84-13973

MOLECULAR STRUCTURE
Molecular basis for local compositions in liquid-mixture models
[DE83-016604] N84-13250

The effect of the structure of metallo-organic complexes on the electrolytic precipitation of titanium and niobium from nonaqueous electrolytes
[BLL-OA-TRANS-3070-(6196.3)] N84-13259
EXAFS study of Metglas 2605 CO
[DE84-001203] N84-13299
Relationship between the glass transition temperature and the chemical structure of polymers
[RAE-TRANS-2088] N84-13312
Chemical and physical characterization of the activation of ribulosebiphosphate carboxylase/oxygenase
[DE83-017226] N84-13764

MOLTEN SALT ELECTROLYTES
Moltencarbonate fuel cells, development status
[DE84-000612] N84-13480

MOLTEN SALTS
Principles of superionic conduction
[DE84-001215] N84-14044

MOLYBDENUM
Structures and properties of rapidly solidified 9Cr-1Mo steel
[DE84-001276] N84-13276
Pulsed-ion-irradiated microstructures in molybdenum
[DE84-000679] N84-13304

MOLYBDENUM ALLOYS
Calculations of composition boundaries of saturated phases
[DE84-001665] N84-13274
Magnetic properties of Mo/Ni superlattices
[DE84-000568] N84-14053

MOMENTS
Preliminary results of the first static calibration of the RSRA helicopter active-isolator rotor balance system
[NASA-TM-84395] N84-13178

MONITORS
Techniques of condition monitoring and fault diagnosis in industry N84-13595
Relativistic-beam pickup test facility
[DE83-017929] N84-13962

MONTE CARLO METHOD
Using simulation to estimate first passage distributions
[AD-A132328] N84-13898

MORPHOLOGY
Formation of structure of low-alloy steel inoculated with rare-earth metals and alkaline-earth metals
[BLL-M-35321] N84-13258

MOSAICS
Spatial filtering for enhancing point targets in images from a space-based mosaic IR detector
[AD-A132248] N84-13425

MOTION SICKNESS
Motion sickness incidence: Distribution of time to first emesis and comparison of some complex motion conditions
[AD-A131930] N84-13772

MOTOR VEHICLES
Humidity measurement comparison tests: Dew point hygrometer versus wet bulb psychrometer
[PB83-237487] N84-13546

MOUNTAINS
Reflection and identification studies applied to terrain imaging radar
[AD-A132401] N84-13419

MULTIPACTOR DISCHARGES
Surface properties of metal-nitride and metal-carbide films deposited on Nb for RF superconductivity
[DE84-001491] N84-14055

MULTIPROCESSING (COMPUTERS)
Scheduling supercomputers
[AD-A132512] N84-13822
SISAL: Streams and Iteration in a Single-Assignment Language. Language reference manual, version 1.1
[DE83-016576] N84-13843

MULTISPECTRAL BAND SCANNERS
Information content of data from the LANDSAT 4 Thematic Mapper (TM) and multispectral scanner (MSS)
[E84-10034] N84-13628
LANDSAT 4 image data quality analysis
[E84-10036] N84-13629
The use of linear feature detection to investigate thematic mapper data performance and processing
[E84-10037] N84-13630
The use of thematic mapper data for land cover discrimination: Preliminary results from the UK SATMaP programme
[E84-10038] N84-13631
Comparative assessment of LANDSAT-4 MSS and TM data quality for mapping applications in the southeast
[E84-10040] N84-13633
Analysis of the quality of image data acquired by the LANDSAT-4 Thematic Mapper (TM) of the Black Hills area, South Dakota
[E84-10041] N84-13634
Analysis of multispectral scanner (MSS) and Thematic Mapper (TM) performance (pre-launch and post-launch)
[E84-10043] N84-13636
Spectroradiometric calibration of the thematic mapper and multispectral scanner system
[E84-10045] N84-13638

MULTIVARIATE STATISTICAL ANALYSIS
Multivariate, minimum-curvature splines for randomly spaced data
[AD-A132319] N84-13899
Asymptotic null and nonnull distributions of three multivariate test statistics in Gmanova
[TR-82] N84-13905

MUONS
Neutrino-oscillation experiments at Brookhaven National Laboratory
[DE83-018275] N84-13476

MUSCULOSKELETAL SYSTEM
An experimental study of multi-link models of human postural dynamics and control N84-13769

N

NACELLES
A computer program for the calculation of three-dimensional transonic nacelle/inlet flowfields
[NASA-CR-166528] N84-13159

NAPHTHENES
Investigation of sources, properties and preparation of distillate test fuels
[NASA-CR-168227] N84-13332

NARCOSIS
The effects of hyperbaric elemental gases on the rate coefficient of K(+) influx in mammalian synaptosomes N84-13754

NARCOTICS
The effects of hyperbaric elemental gases on the rate coefficient of K(+) influx in mammalian synaptosomes N84-13754

NASA PROGRAMS
Replacing critical and strategic refractory metal elements in nickel-base superalloys --- NASA's COSAM program
[NASA-TM-83528] N84-13264

NASTRAN
NASTRAN structural model for the large 64-meter antenna pedestal. Part 2: Improved model N84-13412

NATURAL LANGUAGE (COMPUTERS)
Model Statement Language/analyzer (MSL/MSA): A top-down Problem Statement Language/analyzer (PSL/PSA) approach for the user dialogue in decision support systems
[AD-A132273] N84-13829

NATURAL SATELLITES
Origin and evolution of the Saturn system
[NASA-TM-85847] N84-14096

NAUTICAL CHARTS
Automated standard nautical chart production
[AD-A132249] N84-13644

NAVIER-STOKES EQUATION
A fully vectorized numerical solution of the incompressible Navier-Stokes equations
[NASA-CR-174496] N84-13491
Computation of viscous flow in curved ducts and comparison with experimental data
[NASA-TM-83548] N84-13494
Further studies on equal-order interpolation for Navier-Stokes
[DE84-000916] N84-13512
Acoustic-gravity wave dispersion relations in a baroclinic atmosphere
[PB83-248690] N84-13726

NEAR INFRARED RADIATION
Detectors for optical communications: A review N84-13404

NEGATIVE IONS
Investigation of the dynamics and threshold behavior of endothermic negative ion-neutral reactions
[DE84-001369] N84-13975

NEODYMIUM LASERS
NOVANET: Communications network for a control system
[DE83-013862] N84-13436
High energy efficient solid state laser sources --- slab geometry laser sources
[NASA-CR-174606] N84-13548
NdP5O14 crystal used for miniature rangefinder
[AD-A132541] N84-13549
The Nova laser assurance-management system
[DE83-018188] N84-13568

NETWORK ANALYSIS
Superregenerative amplifier in linear mode as a radar range gate-derivations
[DE84-000978] N84-13474

NEUROLOGY
Event-related brain potentials: An alternative methodology for neurotoxicological research
[PB83-246116] N84-13775

NEUTRAL ATOMS
Introduction: Advances and opportunities in cluster research
[DE84-000364] N84-13917
Construction and operational experience of the tandem mirror experiment-upgrade (TMX-U)
[DE83-018181] N84-13995
Experimental results on finite-beta limits and transport in the ISX-B Tokamak
[DE84-000258] N84-14001

NEUTRAL BEAMS
Summary of the status of negative-ion-based neutral beams
[DE84-001326] N84-13948

NEUTRINO BEAMS
Neutrino-oscillation experiments at Brookhaven National Laboratory
[DE83-018275] N84-13476

NEUTRINOS
Double beta decay: Recent developments and projections
[DE84-000476] N84-13944
Proceedings of the Summer Workshop on Proton Decay Experiments
[DE83-009572] N84-13980

NEUTRON COUNTERS
Measuring the neutron energy spectrum of laser-fusion targets with CR-39
[DE84-001422] N84-13543

NEUTRON CROSS SECTIONS
Comparison of measured and calculated helium production in nickel using newly evaluated neutron cross sections for (59)Ni
[DE84-000565] N84-14035

NEUTRON IRRADIATION
Microstructure of 9 Cr-1 MoVNb steel irradiated to 40 dpa at elevated temperatures in HFIR
[DE84-000339] N84-13285
Development and fabrication of a high current, fast recovery power diode
[NASA-CR-168196] N84-13443
Radiation hardening of oxygen-doped niobium by 14-MeV neutrons
[DE84-000103] N84-14026

NEUTRON SCATTERING
Minaturized disk bend tests of neutron-irradiated path A type alloys
[DE84-001277] N84-13618
Neutron-scattering studies of magnetic superconductors
[DE84-000393] N84-14054

NEUTRON SOURCES
ASPUN, Argonne super intense pulsed pallation neutron source
[DE84-000311] N84-13941

NEUTRON SPECTRA
Measuring the neutron energy spectrum of laser-fusion targets with CR-39
[DE84-001422] N84-13543

NEUTRON STARS
Nuclear physics problems for accreting neutron stars
[DE83-017297] N84-14092
Do pions condense in neutron-star matter?
[DE84-000463] N84-14093

NEUTRONS
Effect of phosphorus on the swelling and precipitation behavior of austenitic stainless steels during irradiation
[DE84-000412] N84-13275

NEVADA
Geology of faults exposed in trenches in Crater Flat, Nye County, Nevada
[DE84-000181] N84-13716
Nevada test site seismic-telemetry measurements
[DE84-000447] N84-13719

NEW MEXICO
Forest area and timber resource statistcs for state and private lands in New Mexico, 1980, Forest Service resource bulletin
[PB83-251157] N84-13667
White Sands Missile Range, New Mexico Range reference atmosphere 0-70 km altitude
[AD-A132471] N84-13738

NEW YORK
Microseismic monitoring for evidence of geothermal heat in the capital district of New York
[PB83-248807] N84-13659

NEWTON THEORY
Fully-coupled solution of pressure-linked fluid flow equations
[DE83-017989] N84-13527

NICKEL
Non-uniformity of elastic micro-deformations in austenitic steels
[BLL-M-35357-(5828.4)] N84-13261

Dislocation/obstacle interactions during low-dose irradiation creep of nickel
[DE84-001416] N84-13303
Mobility of organic complexes of nickel and cobalt in soils
[DE83-017897] N84-13720

NICKEL ALLOYS
Replacing critical and strategic refractory metal elements in nickel-base superalloys — NASA's COSAM program
[NASA-TM-83528] N84-13264
Effect of implanted helium on the microstructure and creep properties of ordered (Fe0.49 Ni0.51)V-3 alloys
[DE84-000891] N84-13278
Wear during rubbing of a sintered metal powder body
[AD-A132354] N84-13584
Comparison of measured and calculated helium production in nickel using newly evaluated neutron cross sections for (59)Ni
[DE84-000565] N84-14035
Magnetic properties of Mo/Ni superlattices
[DE84-000568] N84-14053

NICKEL HYDROGEN BATTERIES
Analysis of regenerative fuel cells
[NASA-CR-171783] N84-13671

NICKEL OXIDES
Solubility of the NiO fuel-cell cathode in Li2CO3 melts as determined by cyclic voltammetry
[DE83-014311] N84-13485

NICKEL-IRON BATTERIES
Application features and considerations in advanced lead-acid and nickel/iron EV batteries
[DE83-C17936] N84-13472

NIOBIUM
The effect of the structure of metallo-organic complexes on the electrolytic precipitation of titanium and niobium from nonaqueous electrolytes
[BLL-OA-TRANS-3070-(6196.3)] N84-13259
Superconducting niobium thin film slow-wave structures N84-13405
Radiation hardening of oxygen-doped niobium by 14-MeV neutrons
[DE84-000103] N84-14026

NITRIC OXIDE
Proceedings of a Workshop on Assessment of Techniques for Measuring Tropospheric N sub x O sub y
[NASA-CP-2292] N84-13706

NITROGEN
N(2) and CO vibrational CARS and h(2) rotational CARS spectroscopy of CH(4)-N(2)O flames
[AD-A132234] N84-13238

NITROGEN COMPOUNDS
Selective catalytic hydrogenation of polynuclear heteroaromatic nitrogen compounds with polymer-supported transition-metal compounds
[DE84-001326] N84-13248

NOCTURNAL VARIATIONS
SRL tethersonde and echosonde data, Anderson Creek Valley, California
[DE84-001660] N84-13715

NOISE GENERATORS
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-3, 208/May-June 1982
[ESA-TT-771] N84-13916

NOISE REDUCTION
Continued research on selected parameters to minimize community annoyance from airport noise
[NASA-CR-174607] N84-13688
Technology evaluation of man-rated acceleration test equipment for vestibular research
[NASA-CR-172160] N84-13781
Inverted velocity profile semi-annular nozzle jet exhaust noise experiments
[NASA-TM-83525] N84-13924

NOISE SPECTRA
Inverted velocity profile semi-annular nozzle jet exhaust noise experiments
[NASA-TM-83525] N84-13924

NONAQUEOUS ELECTROLYTES
Investigation of the possibilities for the electrodeposition of titanium from non-aqueous solutions
[BLL-OA-TRANS-3069-(6196.3)] N84-13267

NONDESTRUCTIVE TESTS
Microwave nondestructive evaluation of composites
[DE84-001777] N84-13601
Development of ultrasonic methods for the nondestructive inspection of concrete
[DE83-017923] N84-13929

NONLINEAR EQUATIONS
On the singularities of certain nonlinear partial differential equations N84-13787
A Numerov-Galerkin technique applied to a finite element shallow-water equations model with enforced conservation of integral invariants and selective lumping
[CSIR-TWISK-276] N84-13878

NONLINEAR EVOLUTION EQUATIONS
Remarks on the Kuramoto-Sivashinsky equation
[DE84-001018] N84-13901

NONLINEAR PROGRAMMING
An application of nonlinear programming to the design of regulators of a linear-quadratic formulation
[NASA-CR-17253] N84-13380

NONLINEAR SYSTEMS
Numerical modeling of the MOSBJT
[AD-A132351] N84-13456
NOSTRUM: A finite element program for nonlinear structural mechanics
[TR-18] N84-13881
Mathematical models of nonlinear galvanic polarization
[AD-A132403] N84-13895
Space-time evolution of the nonlinear 2-stream instability
[DE84-001336] N84-13950
Determining stresses in the presence of nonlinearities in interplanar spacing versus Sin squared Psi
[AD-A132365] N84-14041

NONLINEARITY
Nonlinear acoustics in a dispersive continuum: Random waves, radiation pressure, and quantum noise N84-13920
Observations of nonlinear behavior in a low-pressure discharge column
[AD-A132321] N84-13996
Nonlinear kinetic theory of a single helicity tearing instability
[DE84-000049] N84-14024
Loop coalescence in flares and coronal X-ray brightening
[DE83-013070] N84-14099

NONPARAMETRIC STATISTICS
Adaptive spectral smoothing
[AD-A132574] N84-13887
Time series long memory identification and quantile spectral analysis
[AD-A132240] N84-13900

NOSE CONES
Enhancement of the CAVE computer code — aerodynamic heating package for nose cones and scramjet engine sidewalls
[NASA-CR-3731] N84-13501

NOVA LASER SYSTEM
The Nova laser assurance-management system
[DE83-018188] N84-13568

NOZZLE DESIGN
Effect of thrust reverser operation on the lateral-directional characteristics of a three-surface F-15 model at transonic speeds
[NASA-TP-2234] N84-13165

NUCLEAR CHEMISTRY
Trends in exotic-atom research
[DE84-001679] N84-13974

NUCLEAR ENERGY
Computer software summaries, numbers 424 through 693
[DE83-015297] N84-13834

NUCLEAR EXPLOSIONS
Fields and currents and charges on obstacles in a parallel-plate simulator at selected frequencies and with pulse excitation
[AD-A132406] N84-13418
Propagation of a radio-frequency pulsed signal over the Earth. The JOLLY programs
[DE84-000109] N84-13439
Review of astrophysical research at Los Alamos
[DE83-017304] N84-14091

NUCLEAR FISSION
Separated isotopes: Vital tools for science and medicine
[DE83-011646] N84-13981

NUCLEAR FUELS
A laser-fusion rocket for interplanetary propulsion
[DE84-001238] N84-13219
Hydrogen pellet injection into Alcator C
[DE83-016878] N84-14018

NUCLEAR FUSION
Structural performance of ceramics in a high-fluence fusion environment
[DE84-001311] N84-13329
Separated isotopes: Vital tools for science and medicine
[DE83-011646] N84-13981
Background information and technical basis for assessment of environmental implications of magnetic fusion energy
[DE83-018300] N84-14030

NUCLEAR ISOBARS
The 3-body forces, relativistic effects, isobars, and pions in nuclear systems
[DE84-000163] N84-13938

NUCLEAR MAGNETIC RESONANCE
Analytical studies of advanced high-field designs: 20-Tesla large-bore superconducting magnets
[DE83-017591] N84-13918

NUCLEAR MEDICINE
Nuclear-medicine
[DE84-000346] N84-13759
A study of thick-target X-ray spectra using photonuclear reactions
[AD-A132543] N84-13934

NUCLEAR PHYSICS
Trends in exotic-atom research
[DE84-001679] N84-13974

NUCLEAR RADIATION
Nuclear-medicine
[DE84-000346] N84-13759

NUCLEAR REACTIONS
Nuclear physics problems for accreting neutron stars
[DE83-017297] N84-14092

NUCLEAR REACTORS
A practical sublimation source for large-scale chromium gettering in fusion devices
[DE84-000724] N84-14002
Ion-beam surface analysis in plasma-edge studies
[DE84-001578] N84-14004

NUCLEAR WEAPONS
Bound and free moisture in explosives and plastics
[DE84-001402] N84-13339

NUCLEATE BOILING
Heat transfer to subcooled HE 1
[DE83-017767] N84-13520

NUCLEATION
Predicting the base phase in the crystallization of eutectic alloys
[BLL-M-35347-(5828.4)] N84-13262
Pulsed-ion-irradiated microstructures in molybdenum
[DE84-000679] N84-13304
Physical modeling of the champagne effect
[DE84-001813] N84-13388

NUCLEON-NUCLEON INTERACTIONS
Meson-exchange Hamiltonian for NN scattering and isobar-nucleus dynamics
[DE83-017974] N84-13959

NULL ZONES
Nulling with limited degrees of freedom
[AD-A132276] N84-13424

NUMERICAL ANALYSIS
Test of the inverse square law of gravity at distances of 5cm and 1m N84-13914

NUTRIENTS
Dissolved organic matter and lake metabolism: Biochemistry and controls of nutrient flux dynamics in lakes
[DE83-016789] N84-13761

O

OAO 3
Sounding rocket XUV observations of Capella N84-14078

OBLIQUE COORDINATES
Energization of ions by oblique double layers N84-13700

OBSERVATION
An aid for using the Revised Uniform Summary of Surface Weather Observations (RUSSWOs)
[AD-A132186] N84-13742
A predictive view of the detection of influential observations in Gmanova
[CSIR-TR-83] N84-13904

OCEAN BOTTOM
Marine seismic System(MSS) deployment. Phase IV: Investigation of techniques and deployment scenarios for installation of tri-axial seismometer in a borehole in the deep ocean
[AD-A132300] N84-13710

OCEAN CURRENTS
A variational method for estimating the general circulation in the ocean N84-13626
A satellite study of ocean internal waves
[PB83-248708] N84-13661
Baroclinic Rossby wave signature in a general circulation ocean model
[AD-A132219] N84-13750
Ocean mixing and circulation response in the marginal ice zone
[AD-A132174] N84-13751
Winter currents on the eastern Bering Sea shelf
[PB83-248823] N84-13753

OCEAN DATA ACQUISITIONS SYSTEMS
Real-time processing system for the NRL (Naval Research Laboratory) remote sensing experiment: Phelps Bank, July 1982
[AD-A132151] N84-13645

OCEAN DYNAMICS
A variational method for estimating the general circulation in the ocean N84-13626
Baroclinic Rossby wave signature in a general circulation ocean model
[AD-A132219] N84-13750
OCEAN MODELS
Baroclinic Rossby wave signature in a general circulation ocean model
[AD-A132219] N84-13750
Ocean mixing and circulation response in the marginal ice zone
[AD-A132174] N84-13751
OCEAN TEMPERATURE
Baroclinic Rossby wave signature in a general circulation ocean model
[AD-A132219] N84-13750
OCEANOGRAPHY
Economic benefits of operational environmental satellites
[PB83-252932] N84-13748
A position paper: Mesoscale oceanography from GEOSAT
[AD-A132292] N84-13749
Winter currents on the eastern Bering Sea shelf
[PB83-248823] N84-13753
An interdisciplinary oceanographic database
[CSIR-T/SEA-8207] N84-14064
OCEANS
Stream-water storage in the ocean using an impermeable membrane
[PB83-248369] N84-13394
A variational method for estimating the general circulation in the ocean N84-13626
OCTANE NUMBER
The determination of research octane number of gasoline fuels by octane analyzer
[AD-A132427] N84-13335
OIL POLLUTION
A satellite study of ocean internal waves
[PB83-248708] N84-13661
OIL SLICKS
A satellite study of ocean internal waves
[PB83-248708] N84-13661
ON-LINE SYSTEMS
TIS: An intelligent gateway computer for information and modeling networks. Overview
[DE83-017986] N84-14067
OPACITY
The effect of opacity on theoretical models of RR Lyrae stars N84-14081
OPERATING SYSTEMS (COMPUTERS)
Specification for a Program for an Interative Aeroelastic Solution (PIAS)
[NASA-CR-172200] N84-13153
OPERATIONS
Design and evaluation of small water turbines
[DE84-000404] N84-13586
OPERATORS (MATHEMATICS)
Method of operator splitting or fractional steps and its applications to fluid-dynamic modelling
[DE84-000800] N84-13511
Convolution of generalized vector measures N84-13803
OPTICAL COMMUNICATION
Detectors for optical communications: A review N84-13404
White light signal processing with the application to spread spectrum communications
[AD-A132418] N84-13417
Aperture averaging of scintillation for space-to-ground optical communication applications
[AD-A132198] N84-13428
A survey of electric laser codes
[AD-A132352] N84-13551
OPTICAL EQUIPMENT
Precision support of annular optics
[DE83-017473] N84-13993
OPTICAL FILTERS
Holographic optical elements with ultra-high spatial frequencies
[AD-A132355] N84-13537
Fast, self-nulling spectroscopic ellipsometer: Instrumentation and application, revision
[DE83-015531] N84-13994
OPTICAL MEASURING INSTRUMENTS
Lightning mapper sensor design study
[NASA-CR-170909] N84-13732
OPTICAL PROPERTIES
Aethalometer: An instrument for the real-time measurement of optical absorption by aerosol particles
[DE84-000400] N84-13538
Evaluation of selective solar-absorber surfaces, phase 2
[DE84-000067] N84-13685
Optical properties of the marine aerosol as predicted by a BASIC version of the Navy aerosol model
[AD-A132411] N84-13986
A very large array 1411 MHz radio survey: Properties of ccmplete samples of radio and optically selected QSO candidates in a high galactic-latitude field N84-14076
OPTIMAL CONTROL
Solution of the 2-point boundary value problems of optimal spacecraft rotational maneuvers N84-13870
Study of the optimal control problem solving in the Bolza form by the finite element method
[INPE-2750-PRE/326] N84-13884
OPTIMIZATION
Methods of optimizing parameters of mechanisms performing repeated brief operations
[BLL-M-35352] N84-13575
Optimization of structures subjected to periodic loads N84-13605
Design and development of a high-concentration and high-effiecliency photovoltaic concentrator using a curved Fresnel lens
[DE84-000967] N84-13679
Interacting weights in multiple attribute decision making
[CSIR-TWISK-270] N84-13874
Use of an exact penalty function for optimization of discrete problems
[INPE-2769-PRE/342] N84-13883
ORGANIC COMPOUNDS
Investigation of the possibilities for the electrodeposition of titanium from non-aqueous solutions
[BLL-OA-TRANS-3069-(6196.3)] N84-13267
ORGANIC MATERIALS
Dependence of evolution of toxic gases on burning conditions N84-13377
OSCILLATION DAMPERS
Measurement of rolling friction by a damped oscillator
[NASA-TP-2257] N84-13577
OSCILLATIONS
On the effect of gyroscopic forces on the instability of certain fluid-elastic systems. Part 1: Definitions
[PUBL-340] N84-13499
Determining stresses in the presence of nonlinearities in interplanar spacing versus Sin squared Psi
[AD-A132365] N84-14041
OSMOSIS
Battery transport data
[DE84-001640] N84-13462
OUTGASSING
High altitude aerodynamic tests with simulated heat-shield outgassing
[AD-A132078] N84-13227
Vacuum outgassing of various materials
[DE84-001449] N84-13247
OUTLIERS (STATISTICS)
A predictive view of the detection of influential observations in Gmanova
[CSIR-TR-83] N84-13904
OVENS
Temperature rise of handles and knobs
[BLL-OA-TRANS-3047-(6196.3)] N84-13502
OVERVOLTAGE
China builds first 6000kV type pulse voltage generator
[AD-A132564] N84-13449
OXIDATION
Relationships between strength, electrical conductivity, and density for oxidized PGX graphite
[DE83-016184] N84-13325
OXIDATION RESISTANCE
Oxidation of Inconel alloy MA754 at low oxidation potential
[DE83-017191] N84-13288
OXIDE FILMS
The localized corrosion of aluminum alloys: A review
[AD-A132582] N84-13269
OXIDES
Solid-oxide fuel cells
[DE83-017925] N84-13469
OXYGEN
Survey of water quality and flow in Maryland coastal zone streams: A data report
[PB83-249375] N84-13660
Early mechanisms in radiation-induced biological damage
[DE84-001511] N84-13765
OXYGEN METABOLISM
Respiration of roots response to low O2 stress
[DE83-017495] N84-13766
OZONE
Respiratory effects on population from low-level exposures to ozone
[PB83-246132] N84-13774

P

P-I-N JUNCTIONS
Development and fabrication of a high current, fast recovery power diode
[NASA-CR-168196] N84-13443
PACKINGS (SEALS)
Void-free epoxy castings for cryogenic insulators and seals
[DE83-017273] N84-13479
PANEL METHOD (FLUID DYNAMICS)
Development of a computer code for a three-dimensional higher order panel method for subsonic potential flow
[FFA-138] N84-13155
PARABOLIC DIFFERENTIAL EQUATIONS
An introduction to the parabolic equation for acoustic propagation
[AD-A132315] N84-13925
PARABOLIC REFLECTORS
Structural analysis of a glass/space frame parabolic-trough solar collector for various operating positions
[DE84-001137] N84-13622
Photovoltaic concentrators: Recent developments
[DE84-001641] N84-13687
PARAFFINS
Investigation of sources, properties and preparation of distillate test fuels
[NASA-CR-168227] N84-13332
PARALLEL PROCESSING (COMPUTERS)
Issues in the design and implementation of Act2
[AD-A132326] N84-13826
SISAL: Streams and Iteration in a Single-Assignment Language. Language reference manual, version 1.1
[DE83-016576] N84-13843
Logic design of a shared disk system in a multi-micro computer environment
[AD-A132165] N84-13862
PARAMETER IDENTIFICATION
Methods of optimizing parameters of mechanisms performing repeated brief operations
[BLL-M-35352] N84-13575
Benchmarking the join operations of relational database machines
[AD-A132312] N84-13861
PARAMETERIZATION
Advanced Hough transform implementations
[AD-A132522] N84-13890
PARTIAL DIFFERENTIAL EQUATIONS
Construction and verification of a finite-element method for nonisothermal flows in porous media
[DE83-017158] N84-13522
On the singularities of certain nonlinear partial differential equations N84-13787
On quasi-parabolic problems with normal boundary conditions N84-13797
On L sup p-integrability in PDE's and quasiregular mappings for large exponents N84-13799
A Numerov-Galerkin technique applied to a finite element shallow-water equations model with enforced conservation of integral invariants and selective lumping
[CSIR-TWISK-276] N84-13878
Averaging procedures of multiphase conservation equations
[DE83-014698] N84-13908
PARTICLE ACCELERATION
Characteristics of gamma-ray line flares
[NASA-CR-174608] N84-14098
PARTICLE ACCELERATORS
Control and operation cost optimization of the HISS cryogenic system
[DE83-017741] N84-13384
High-sensitivity laser spectroscopy with atoms from a cooled helium jet
[DE84-000614] N84-13554
Assessment of the adequacy of US accelerator technology for Department of Energy Missions
[DE84-001632] N84-13945
New concepts in particle acceleration
[DE83-017747] N84-13961
Acceleration of heavy ions in the AGS and CBA
[DE83-017762] N84-13963
PARTICLE BEAMS
PATH: A lumped-element beam-transport simulation program with space charge
[DE84-001330] N84-13953
Physics with polarized beams in e+e(-) colliders
[DE83-016441] N84-13976
PARTICLE COLLISIONS
Physics with polarized beams in e+e(-) colliders
[DE83-016441] N84-13976
PARTICLE IN CELL TECHNIQUE
Energetic plasma-beam propagation in weak and strong magnetic fields
[DE84-001362] N84-14005

PARTICLE INTERACTIONS
Positive ion-molecule reactions in OCS/hydrocarbon mixtures
[AD-A132350] N84-13237
Problems and prospects in strange baryon spectroscopy
[DE83-018119] N84-13253
PARTICLE LADEN JETS
A theoretical and experimental study of turbulent particle-laden jets
[NASA-CR-168293] N84-13187
PARTICLE PRODUCTION
Problems and prospects in strange baryon spectroscopy
[DE83-018119] N84-13253
PARTICLE SIZE DISTRIBUTION
Coil planet centrifugation as a means for small particle separation
[NASA-TM-82561] N84-13756
PARTICLE THEORY
Some double-valued representations of the linear groups
[DE84-001525] N84-13913
PARTICLE TRAJECTORIES
Energization of ions by oblique double layers N84-13700
PASSIVITY
In-situ photoacoustic spectrometry for corrosion studies
[DE84-001994] N84-13254
International Meeting on Lithium Batteries
[AD-A132371] N84-13455
PATENTS
Stirling engine patents: International patent inventory
[DE84-002378] N84-13592
PATHOLOGY
Study of biological samples obtained from victims of MGM Grand Hotel fire N84-13374
PATTERN RECOGNITION
Generating three-dimensional surface models of solid objects from multiple projections
[AD-A132392] N84-13824
Advanced Hough transform implementations
[AD-A132522] N84-13890
Advanced pattern recognition
[AD-A132339] N84-13987
PELLETS
Hydrogen pellet injection into Alcator C
[DE83-016878] N84-14018
PENALTY FUNCTION
Use of an exact penalty function for optimization of discrete problems
[INPE-2769-PRE/342] N84-13883
PENDULUMS
Digital instrumentation package or an improved torsion pendulum
[PB83-240424] N84-13547
PENETRANTS
Penetrant and magnetic-particle inspection for material integrity
[DE83-017830] N84-13600
PENETRATION
Diffusion and sorption of cyclohexane vapor in SBS and SBR copolymers
[AD-A132397] N84-13315
PEPTIDES
Chemical and physical characterization of the activation of ribulosebiphosphate carboxylase/oxygenase
[DE83-017226] N84-13764
PERFORMANCE PREDICTION
Acoustic modelling and analysis of pulsating combustion in a gas-fired pulse burner N84-13921
PERFORMANCE TESTS
Investigation of sources, properties and preparation of distillate test fuels
[NASA-CR-168227] N84-13332
Flat-plate solar-collector performance data base and user's manual
[DE83-011993] N84-13682
Analysis and modeling of photosynthetic bacterial hydrogen production plants
[DE84-000003] N84-13758
Electrical and magnetic properties of the energy-saver correction elements
[DE83-017327] N84-13983
Baseline and verification tests of the electric vehicle associates' current fare station wagon
[AD-A132549] N84-14072
PERIODIC FUNCTIONS
Some grid generations using conformal mapping
[NAL-TR-758] N84-13871
PERIODIC VARIATIONS
Rise in the frequency of cloud cover in LANDSAT data for the period 1973 to 1981 --- Brazil
[E84-10047] N84-13640
PERMAFROST
Glaciological data: Permafrost. A bibliography, 1978 - 1982
[PB83-249730] N84-13724
PERSONNEL
Effect of carbon monoxide (CO) on firefighters N84-13357
PERTURBATION
Characterization of the general purpose research furnace for low-G directional solidification experiments
[NASA-TM-85718] N84-13211
PERTURBATION THEORY
Molecular basis for local compositions in liquid-mixture models
[DE83-016604] N84-13250
Equations governing the liquid-film flow over a plane with heat flux and interfacial phase change
[DE83-017528] N84-13525
Perturbation methods for slightly damped gyroscopic systems N84-13534
Recent developments in the understanding of pion-nucleus scattering
[DE84-001017] N84-13942
PETROGRAPHY
Petrographic examination of Bell Canyon Tests (BCT) 1-FF field grouts over a 3-year period
[DE83-018226] N84-13654
PETROLOGY
Summaries of physical research in the geosciences
[DE83-017885] N84-13624
PHASE DIAGRAMS
Thermal modeling of laser welding with a quasi-1-dimensional approach
[DE84-001292] N84-13585
PHASE LOCKED SYSTEMS
Phase locked loop theory and application: A precis paper
[CSIR-NIAST-82/57] N84-13444
PHASE MODULATION
Adaptive array behavior with periodic phase modulated interference
[AD-A132229] N84-13427
PHASE TRANSFORMATIONS
Phase and compression behavior in sedimentation and thickening of liquid-solid suspensions
[PB83-249664] N84-13257
Dilatometric investigation of phase-transformation kinetics in HP 9-4-20 steel
[DE84-001180] N84-13280
The relationship between the martensitic phase transition and the superconducting properties of A15 compounds
[DE83-018186] N84-13477
Equations governing the liquid-film flow over a plane with heat flux and interfacial phase change
[DE83-017528] N84-13525
Proceedings of the Seventh International Conference on High Voltage Electron Microscopy
[DE83-016323] N84-13540
Far infrared studies on superconductors and heat-capacity studies on liquid crystals
[DE84-001105] N84-14046
Prediction of high-pressure phase transitions in solid N2 and the pressure dependence of the intramolecular vibrational frequencies
[DE83-015260] N84-14057
PHASED ARRAYS
Microwave monolithic integrated circuit development for future spaceborne phased array antennas
[NASA-TM-83518] N84-13399
Signal processor interface simulation of the AN/SPY-1A radar controller
[AD-A132170] N84-13429
PHONONS
Shock induced molecular excitation in solids
[AD-A132236] N84-13935
Revision of the statistical mechanics of phonons to include phonon line widths
[DE83-017229] N84-14051
PHOSPHORIC ACID FUEL CELLS
Develop and test fuel cell powered on-site integrated total energy system
[NASA-CR-168239] N84-13673
PHOSPHORUS
Radiation-induced phosphorus segregation in austenitic and ferritic alloys
[DE84-000903] N84-13302
Effects of simultaneous phosphorus and arsenic diffusions on emitter push and dislocation generation
[AD-A132331] N84-14042
PHOTOACOUSTIC SPECTROSCOPY
In-situ photoacoustic spectrometry for corrosion studies
[DE84-001994] N84-13254
PHOTOCATHODES
Evaluation of Hamamatsu R1635 photomultiplier
[DE84-001252] N84-13468
Deposition of cesium iodide on papylene
[DE83-017839] N84-13992
PHOTOCHEMICAL REACTIONS
The 1982 International Congress of Photographic Science
[AD-A132372] N84-13536
Intermolecular energy-transfer processes
[DE84-000334] N84-13971
Radiative transfer and photochemistry in the upper atmosphere of Jupiter N84-14095
PHOTOCONDUCTIVITY
The 1982 International Congress of Photographic Science
[AD-A132372] N84-13536
Dynamic aspects of the dye-sensitized photoconductivity of semiconductors
[DE84-001132] N84-14059
PHOTOELECTRIC EMISSION
Photo-induced field emissions from metallic surfaces
[DE84-000872] N84-13966
PHOTOELECTRON SPECTROSCOPY
Quantitative determination of the intensities of known components in spectra obtained from surface analytical techniques
[DE84-000926] N84-13239
Application of surface-physics techniques to the study of electrochemical systems
[DE84-000957] N84-13245
PHOTOGEOLOGY
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E84-10050] N84-13643
Correlation of LANDSAT and air photo linears with roof control problems and geologic features
[PB83-250852] N84-13656
PHOTOGRAPHIC EMULSIONS
The 1982 International Congress of Photographic Science
[AD-A132372] N84-13536
PHOTOGRAPHS
Natural hazards photograph catalog, key to geophysical records documentation no. 20
[PB83-250415] N84-13674
PHOTOINTERPRETATION
Photo interpretation key to Michigan land cover/use
[E84-10048] N84-13641
PHOTOIONIZATION
The Crab Nebula: A theoretical and observational study N84-14074
PHOTOLYSIS
Dissociative ionization of liquid water induced by vibrational overtone excitation
[DE83-017739] N84-13251
PHOTOMULTIPLIER TUBES
Evaluation of Hamamatsu R1635 photomultiplier
[DE84-001252] N84-13468
Channel electron multiplier and optically coupled amplifier used as an incident-flux monitor
[DE84-001451] N84-13539
PHOTON BEAMS
Origin of electron-bombardment enhanced reactivity of graphite with hydrogen
[DE83-017561] N84-13960
PHOTONUCLEAR REACTIONS
A study of thick-target X-ray spectra using photonuclear reactions
[AD-A132543] N84-13934
PHOTOSYNTHESIS
Fate and effects of metals in the sea-surface microlayer
[DE84-000114] N84-13752
Yields photosynthetic efficiencies, and proximate chemical composition of dense cultures of marine microalgae, a subcontract report
[DE83-011992] N84-13757
PHOTOVOLTAIC CELLS
Design analysis of advanced photovoltaic technologies
[DE84-000008] N84-13675
Photovoltaic-cell-reseach priorities
[DE84-000066] N84-13683
Photovoltaic concentrators: Recent developments
[DE84-001641] N84-13687
PHOTOVOLTAIC EFFECT
Effect of silane fraction on the optoelectronic and photovoltaic properties of RF-glow-discharge a-Si:H prepared from SiH4 + H2 mixtures
[DE83-016730] N84-14058
PHYSICAL CHEMISTRY
Formation of structure of low-alloy steel inoculated with rare-earth metals and alkaline-earth metals
[BLL-M-35321] N84-13258

Proceedings of the 4th International Conference on Physicochemical Hydrodynamics
[DE83-012765] N84-13532
PHYSICAL EXERCISE
Adaptations to a high fat diet which increase exercise endurance in male rats N84-13755
Physiological responses of normotensives and essential hypertensives to exercise in the heat N84-13768
PHYSICAL FACTORS
Studies of emotional instability in smoke from fires: Decrease of thinking powers and of memory in fire smoke N84-13355
PHYSIOLOGICAL EFFECTS
Physiological function of combustion gas and especially that of CN N84-13376
Respiratory effects on population from low-level exposures to ozone
[PB83-246132] N84-13774
PHYSIOLOGICAL RESPONSES
Physiological responses of normotensives and essential hypertensives to exercise in the heat N84-13768
Decompression procedures for flying after diving, and diving at altitudes above sea level
[AD-A132039] N84-13771
Motion sickness incidence: Distribution of time to first emesis and comparison of some complex motion conditions
[AD-A131930] N84-13772
PIEDMONTS
The hardwood resource on nonindustrial private forest land in the southeast Piedmont
[PB83-252759] N84-13663
PIEZOELECTRIC CERAMICS
Targeted basic studies of ferroelectric and ferroelastic materials for piezoelectric transducer applications
[AD-A132136] N84-13461
Targeted basic studies of ferroelectric and ferroelastic materials for piezoelectric transducer applications
[AD-A132262] N84-14043
PIEZOELECTRIC TRANSDUCERS
Targeted basic studies of ferroelectric and ferroelastic materials for piezoelectric transducer applications
[AD-A132136] N84-13461
Targeted basic studies of ferroelectric and ferroelastic materials for piezoelectric transducer applications
[AD-A132262] N84-14043
PILOT PERFORMANCE
Aircraft accident report - United Airlines Flight 2885, N8053U, McDonnell Douglas DC-8-54F, Detroit, Michigan, January 11, 1983
[PB83-910407] N84-13168
PINCH EFFECT
Design of a high-brightness, low-jitter, short-pulse laser for plasma diagnostics
[DE84-000129] N84-13564
PIONS
The 3-body forces, relativistic effects, isobars, and pions in nuclear systems
[DE84-000163] N84-13938
Do pions condense in neutron-star matter?
[DE84-000463] N84-14093
PIPELINES
Scheduling supercomputers
[AD-A132512] N84-13822
PIPES (TUBES)
Testing of epoxy-phenolic coating for lining carbon steel pipe
[DE84-90073] N84-13322
Condensation heat transfer of steam on a single horizontal tube
[AD-A132245] N84-13508
Welding deformations and residual stresses due to circumferential welding of cylindrical shells and hemispherical end plates
[DRIC-T-6968] N84-13602
Inelastic analysis of piping and tubular structures
[PB83-249987] N84-13623
The effect of condensate inundation on steam condensation heat transfer to wire-wrapped tubing
[AD-A132175] N84-14060
PISTONS
A new operation method for a large-scale shock tunnel
[NAL-TR-765] N84-13200
PITTING
The localized corrosion of aluminum alloys: A review
[AD-A132582] N84-13269
PLANAR STRUCTURES
NOSTRUM: A finite element program for nonlinear structural mechanics
[TR-18] N84-13881
PLANE STRAIN
The dynamic in plane response at the centre of a rotating elastic disc due to oscillatory in plane forces at the rim
[ISVR-TR-121] N84-13613
The plane stress/strain analysis of non-homogeneous continua by the boundary integral equation method
[TR-821S] N84-13880
PLANETARY ATMOSPHERES
Baroclinic waves in the atmosphere of Mars: Observations, linear instability, and finite-amplitude evolution N84-14094
PLANETARY EVOLUTION
Origin and evolution of the Saturn system
[NASA-TM-85847] N84-14096
PLANKTON
Dissolved organic matter and lake metabolism: Biochemistry and controls of nutrient flux dynamics in lakes
[DE83-016789] N84-13761
PLANNING
A guide for effluent radiological measurements at DOE installations
[DE83-016639] N84-13542
PLANT DESIGN
Moltencarbonate fuel cells, development status
[DE84-000612] N84-13480
PLANT STRESS
Respiration of roots response to low O2 stress
[DE83-017495] N84-13766
PLANTS (BOTANY)
NASA space biology accomplishments, 1982
[NASA-TM-86244] N84-13206
PLASMA CHEMISTRY
Study of plasma chemistry and plasma processing
[AD-A132207] N84-13997
PLASMA CONTROL
Construction and operational experience of the tandem mirror experiment-upgrade (TMX-U)
[DE83-018181] N84-13995
Resonant-3-wave mode coupling in inhomogeneous plasmas: Symmetry breaking by omega meson-*
[DE84-001633] N84-13999
Ambipolarity and transport with resonant ion diffusion in EBT
[DE84-000333] N84-14000
CTR plasma engineering studies
[DE84-001279] N84-14006
Evolution of the mirror machine
[DE83-016942] N84-14009
High-density Z-pinch research
[DE83-017311] N84-14013
TMX-U diagnostic system
[DE83-017834] N84-14015
Hydrogen pellet injection into Alcator C
[DE83-016878] N84-14018
Energetic-particle stabilization of ballooning modes in Tokamaks
[DE83-016205] N84-14020
Background information and technical basis for assessment of environmental implications of magnetic fusion energy
[DE83-018300] N84-14030
Steady-state hydrogen transport in solids exposed to fusion-reactor plasmas. Part 3: Applications of theory
[DE84-001646] N84-14033
Plasma/neutral gas transport in divertors and limiters
[DE84-001594] N84-14034
PLASMA CURRENTS
Variational theory of RF-driven currents
[DE83-016745] N84-14022
PLASMA DENSITY
Ponderomotive effects in nonneutral plasmas
[AD-A132109] N84-13998
PLASMA DIAGNOSTICS
Thomson-scattering measurements of electron temperature and density in a plasma channel created by a relativistic electron beam
[DE84-000356] N84-13940
Tomographic technique in relativistic electron beam experiments
[DE84-000357] N84-13949
TMX-U diagnostic system
[DE83-017834] N84-14015
Investigation of soft X-ray reflective coatings
[DE84-000510] N84-14025
PLASMA DRIFT
Locally omnigenous tandem-mirror design
[DE84-001605] N84-14007
PLASMA EQUILIBRIUM
Application of the implicit Fourier-expansion method to the calculation of three-dimension equilibria by the iterative method
[DE83-017621] N84-13902
Ponderomotive effects in nonneutral plasmas
[AD-A132109] N84-13998
Inverse plasma equilibria
[DE84-000723] N84-14008
PLASMA ETCHING
Study of plasma chemistry and plasma processing
[AD-A132207] N84-13997
PLASMA HEATING
Summary of the status of negative-ion-based neutral beams
[DE84-001328] N84-13948
Space-time evolution of the nonlinear 2-stream instability
[DE84-001336] N84-13950
Scientific program and abstracts
[DE83-017620] N84-13967
Experimental results on finite-beta limits and transport in the ISX-B Tokamak
[DE84-000258] N84-14001
CTR plasma engineering studies
[DE84-001279] N84-14006
PLASMA INTERACTIONS
Wave and particle observations associated with the beam plasma discharge in a space simulation chamber N84-13210
PLASMA JETS
Observations of nonlinear behavior in a low-pressure discharge column
[AD-A132321] N84-13996
PLASMA PHYSICS
Application of the implicit Fourier-expansion method to the calculation of three-dimension equilibria by the iterative method
[DE83-017621] N84-13902
Analysis of mechanisms for anode plasma formation in ion diodes
[DE83-017793] N84-14010
PLASMA PUMPING
Continuous plasma treatment and resin impregnation of a high-strength fiber material
[DE84-000314] N84-13229
PLASMA SHEATHS
Analysis of mechanisms for anode plasma formation in ion diodes
[DE83-017793] N84-14010
PLASMA TURBULENCE
Observations and theory of irregularities of middle latitude sporadic E layers N84-13703
PLASMA-PARTICLE INTERACTIONS
Space-time evolution of the nonlinear 2-stream instability
[DE84-001336] N84-13950
Filamentation instability of ion acoustic waves driven by a scattered relativistic beam
[DE84-001323] N84-13956
PLASMAS (PHYSICS)
Positive ion-molecule reactions in OCS/hydrocarbon mixtures
[AD-A132350] N84-13237
Plasma polymerized high energy density dielectric films for capacitors
[NASA-CR-168233] N84-13310
PLASMONS
Absolutely unstable stimulated Brillouin scattering and 2-plasmon decay
[DE84-000823] N84-14032
PLASTIC PROPERTIES
Computational models for cyclic plasticity, rate dependence and creep in finite element analysis
[PB83-245829] N84-13308
Generalized plastic hinge concepts for 3D beam-column elements
[PB83-247981] N84-13391
Welding deformations and residual stresses due to circumferential welding of cylindrical shells and hemispherical end plates
[DRIC-T-6968] N84-13602
PLASTICS
Bound and free moisture in explosives and plastics
[DE84-001402] N84-13339
PLATES (STRUCTURAL MEMBERS)
Detection of closed internal fatigue cracks
[DE83-017686] N84-13620
PLOTTING
An analysis of pC-3 micropulsion in the geomagnetic field
[AD-A132443] N84-13709
Portable FORTRAN contour-plotting subprogram
[DE83-017422] N84-13846
ANALYSIS/PLOT: A graphics package for use with the SORT/ANALYSIS data bases
[DE83-017886] N84-13847
PLUMES
Recent US progress in fire growth modeling N84-13354
New relationships for turbulent plumes
[NAL-TR-763] N84-13495
Characterization of reactants, reaction mechanisms and reaction products leading to extreme acid rain and acid aerosol conditions in southern California
[PB83-252825] N84-13697

On some flow characteristics of conventional and excited jets
[NASA-TM-83503] N84-13922
PLY ORIENTATION
INHYD: Computer code for intraply hybrid composite design. A users manual
[NASA-TP-2239] N84-13224
POISSON EQUATION
Solution of Poisson equations for 3-dimensional grid generations — computations of a flow field over a thin delta wing
[NASA-TM-85857] N84-13886
POLARIMETERS
Spectroradiometric calibration of the thematic mapper and multispectral scanner system
[E84-10045] N84-13638
POLARIZATION (CHARGE SEPARATION)
Mathematical models of nonlinear galvanic polarization
[AD-A132403] N84-13895
POLARIZATION (SPIN ALIGNMENT)
Physics with polarized beams in e+e(-) colliders
[DE83-016441] N84-13976
POLLUTION MONITORING
Performance specifications for continuous monitoring of total reduced sulfur emissions (proposed July 20, 1981, 46 FR 37287), summary of comments and responses
[PB83-251009] N84-13696
Use of fauna as biomonitors
[DE83-016082] N84-13762
POLLUTION TRANSPORT
Oxygen-18 measurements in the assessment of natural and anthropogenic sulfur in the environment
[DE84-000566] N84-13690
Ecological Research Division marine research program
[DE83-017880] N84-13691
POLYBUTADIENE
Fracto-emission from polymers
[AD-A132462] N84-13314
POLYCHLORINATED BIPHENYLS
Dynamic mass balance of PCB (polychlorinated biphenyls) and suspended solids in Saginaw Bay: A case study
[PB83-250308] N84-13699
POLYCRYSTALS
Design analysis of advanced photovoltaic technologies
[DE84-000008] N84-13675
Determining stresses in the presence of nonlinearities in interplanar spacing versus Sin squared Psi
[AD-A132365] N84-14041
POLYGONS
Regular n-gons and Fuchsian groups N84-13798
POLYMER CHEMISTRY
Relationship between the glass transition temperature and the chemical structure of polymers
[RAE-TRANS-2098] N84-13312
POLYMERIC FILMS
Study of plasma chemistry and plasma processing
[AD-A132207] N84-13997
POLYMERIZATION
Cobalt ion-containing epoxies
[NASA-TM-85715] N84-13309
Plasma polymerized high energy density dielectric films for capacitors
[NASA-CR-168233] N84-13310
POLYMERS
Fracto-emission from polymers
[AD-A132462] N84-13314
Aging of polymeric materials
[AD-A132250] N84-13318
POLYNOMIALS
On the Fatou set of monic polynomials N84-13788
The specific solutions of a uniform algebraic differential equation of the second order N84-13790
POLYNUCLEAR ORGANIC COMPOUNDS
Selective catalytic hydrogenation of polynuclear heteroaromatic nitrogen compounds with polymer-supported transition-metal compounds
[DE84-001326] N84-13248
PONDEROMOTIVE FORCES
Ponderomotive effects in nonneutral plasmas
[AD-A132109] N84-13998
PONDS
Calibration of laboratory bioassays with results from microcosms and ponds
[DE83-017224] N84-13692
POROSITY
Mechanisms of elevated-temperature rupture in single-phase ceramics
[DE83-017779] N84-13327
Elastic-wave scattering from multiple voids (porosity)
[DE83-018076] N84-13598
POROUS MATERIALS
Battery transport data
[DE84-001640] N84-13462
Construction and verification of a finite-element method for nonisothermal flows in porous media
[DE83-017158] N84-13522
POSITION (LOCATION)
Hazardous location identification by computer
[CSIR-TR-RF/6/81] N84-13814
POSITION INDICATORS
Crash Position Indicator/Crash Survivable Flight Data Recorder ejectable versus nonejectable
[AD-A132329] N84-13184
POSITRONS
Physics with polarized beams in e+e(-) colliders
[DE83-016441] N84-13976
POTASSIUM COMPOUNDS
Development of electrolysis-cell separator for 1250C operation. Advanced alkaline electrolysis cell development
[DE84-000439] N84-13484
POTASSIUM HYDROXIDES
Characterization of high-temperature vapor-phase species and vapor-solid interactions of import to combustion and gasification processes in the energy technologies
[DE83-015166] N84-13242
POTENTIAL FLOW
Development of a computer code for a three-dimensional higher order panel method for subsonic potential flow
[FFA-138] N84-13155
POWDER (PARTICLES)
Automated thermal conductivity probe and applications to powders
[DE84-000451] N84-13328
Component temperature versus laser-welding parameters
[DE84-000362] N84-13559
POWER SPECTRA
An analysis of pC-3 micropulsion in the geomagnetic field
[AD-A132443] N84-13709
Multisignal Minimum-Cross-Entropy spectrum analysis weighted priors
[AD-A132358] N84-13896
POWER SUPPLIES
Power effects on the longitudinal characteristics on single-engine propeller-driven aircraft
[ARL-AERO-REPT-157] N84-13174
POWERED LIFT AIRCRAFT
Flight-test of the glide-slope track and flare-control laws for an automatic landing system for a powered-lift STOL airplane
[NASA-TP-2128] N84-13198
PREAMPLIFIERS
Low-noise gallium-arsenide field-effect transistor preamplifiers for stochastic beam-cooling systems
[DE83-017535] N84-13475
PRECIPITATION (METEOROLOGY)
Development of design hyetographs for southern Nevada
[DE84-001227] N84-13649
Precipitation development in midlatitude cyclones: A study of cloud structures and processes N84-13728
A numerical study of cloud and precipitation processes in mesoscale rainbands N84-13729
Rain estimation from satellites: An examination of the Griffith-Woodley technique
[NASA-TM-84969] N84-13735
PRECIPITATION HARDENING
Effect of phosphorus on the swelling and precipitation behavior of austenitic stainless steels during irradiation
[DE84-000412] N84-13275
PRECISION
Precision support of annular optics
[DE83-017473] N84-13993
PREDICTION ANALYSIS TECHNIQUES
A general framework for learning curve reliability growth models
[AD-A132277] N84-13596
Development of a technique for short-term prediction of hydrometeors using advection and physical forcing
[AD-A132259] N84-13740
Quasi-Lagrangian diagnostics applied to an extratropical explosive cyclogenesis in the North Pacific
[AD-A132213] N84-13741
Multisignal Minimum-Cross-Entropy spectrum analysis weighted priors
[AD-A132358] N84-13896
Prediction of high-pressure phase transitions in solid N2 and the pressure dependence of the intramolecular vibrational frequencies
[DE83-015260] N84-14057
PREDICTIONS
Triservice program for extending missile aerodynamic data base and prediction program using rational modeling
[AD-A132455] N84-13166
Glass fibre/epoxy resin interface life-time prediction
[AD-A132206] N84-13320
Recent progress at NBS in fire growth modeling N84-13372
RF performance of a proposed L-band antenna system N84-13410
Probabilistic fatigue life predictions of structural components in high-cycle fatigue regimes
[AD-A132425] N84-13615
Parametric model for peak flow prediction in ungaged ephemeral watersheds
[PB83-249698] N84-13658
PREWATE: An interactive preprocessing computer code to the Weight Analysis of Turbine Engines (WATE) computer code
[NASA-TM-83545] N84-13812
Selecting a subset of regression variables so as to maximize the prediction accuracy at a specified point
[CSIR-TWISK-275] N84-13903
A predictive view of the detection of influential observations in Gmanova
[CSIR-TR-83] N84-13904
Energy-efficient automobiles for the future
[DE84-000600] N84-14073
PRESSES
Feasibility of using a large press (80,000 - 200,000 tons) for manufacturing future components on Army systems
[AD-A132398] N84-13582
PRESSING (FORMING)
Feasibility of using a large press (80,000 - 200,000 tons) for manufacturing future components on Army systems
[AD-A132398] N84-13582
PRESSURE DISTRIBUTION
Analysis of pressure distributions on a wing with an oscillating trailing edge flap in subsonic and transonic flow N84-13145
Specification for a Program for an Interative Aeroelastic Solution (PIAS)
[NASA-CR-172200] N84-13153
Internal pressure distributions for a two-dimensional thrust-reversing nozzle operating at a free-stream Mach number of zero
[NASA-TM-85655] N84-13161
An experimental investigation into the forebody and engine inlet airflow characteristics of a photographic reconnaissance window pallet on the RF/A-18 aircraft
[AD-A132271] N84-13167
Investigation of the wall pressure, wall shear stress and velocity fields associated with a turbulent spot in a laminar boundary layer N84-13488
PRESSURE DRAG
Embedded cavity drag in steady and unsteady flows
[NASA-CR-172275] N84-13493
PRESSURE EFFECTS
The effects of hyperbaric elemental gases on the rate coefficient of K(+) influx in mammalian synaptosomes N84-13754
PRESSURE GRADIENTS
Investigation of axisymmetric confined turbulent jet mixing in the near region with adverse pressure gradient N84-13148
Further studies on equal-order interpolation for Navier-Stokes
[DE84-000916] N84-13512
PRESSURE MEASUREMENT
Fiber optics temperature and pressure probe
[DE84-001785] N84-13990
PRESSURE REDUCTION
Decompression procedures for flying after diving, and diving at altitudes above sea level
[AD-A132039] N84-13771
PRESSURE SENSORS
Work done to determine the source of errors on conditioned pressure transduce signals in the JT9D-7F turbofan engines used on SAA Boeing 747 aircraft
[NIAST-82/78] N84-13192
Fiber optics temperature and pressure probe
[DE84-001785] N84-13990
PRESSURE VESSELS
Analysis of hydrogen attack on pressure-vessel steels
[DE84-00061] N84-13301
Pressure system recertification at NASA-Langley Research Center
[NASA-TM-85733] N84-13576
Neutron measurements and radiation damage calculations for fusion materials studies
[DE83-014790] N84-14011
PRINTED CIRCUITS
Vapor degreaser/ultrasonic cleaner solvent evaluation
[DE84-002015] N84-13331

PRINTERS
The DJS-054II microcomputer
[AD-A132552] N84-13807
PRINTING
User's guide to Sandia TEX
[DE83-016763] N84-13840
PROBABILITY DENSITY FUNCTIONS
PDF: A computer program for calculation of turbulent combustion utilizing a Probabilty Density Function (PDF) approach
[DE84-000999] N84-13240
A predictive view of the detection of influential observations in Gmanova
[CSIR-TR-83] N84-13904
PROBABILITY DISTRIBUTION FUNCTIONS
Calculation of the life of components of metallurgical equipment from the parameter of failure probability
[BLL-M-35351-(5828.4F)] N84-13594
Probabilistic fatigue life predictions of structural components in high-cycle fatigue regimes
[AD-A132425] N84-13615
Motion sickness incidence: Distribution of time to first emesis and comparison of some complex motion conditions
[AD-A131930] N84-13772
Using simulation to estimate first passage distributions
[AD-A132328] N84-13898
Analysis-plot generation code with significance levels computed using Kolmogorov-Smirnov statistics valid for both large and small samples
[DE84-001581] N84-13907
PROBABILITY THEORY
External versus intuitive reasoning: The conjunction fallacy in probability judgment
[AD-A131801] N84-13778
The linear hierarchical model and its application in the econometric analysis
[CSIR-TWISK-274] N84-13875
PLY: A system of plausibility inference with a probabilistic basis
[AD-A132537] N84-13889
Analysis-plot generation code with significance levels computed using Kolmogorov-Smirnov statistics valid for both large and small samples
[DE84-001581] N84-13907
PROBES
Trends in exotic-atom research
[DE84-001679] N84-13974
PROBLEM SOLVING
Current state of titanium coating methods
[BLL-OA-TRANS-3067-(6196.3)] N84-13268
Impossibility of distributed consensus with one faulty process
[AD-A132503] N84-13823
On interpolation methods for boundary value ordinary differential equations N84-13869
Solution of the 2-point boundary value problems of optimal spacecraft rotational maneuvers N84-13870
Splines and the Galerkin method for solving the integral equations of scattering theory
[CSIR-TWISK-267] N84-13873
Study of the optimal control problem solving in the Bolza form by the finite element method
[INPE-2750-PRE/326] N84-13884
Remarks on the Kuramoto-Sivashinsky equation
[DE84-001018] N84-13901
A solution technique for complex matrix games
[ARL-SYS-NOTE-83] N84-13910
On the interactions of incentive and information structures
[DE83-012084] N84-14065
PRODUCT DEVELOPMENT
Development of a residential gas-absorption heat pump
[DE83-017218] N84-13526
PRODUCTION ENGINEERING
Investigation in the application of computer-aided process-planning techniques for mechanical engineering at Bendix Kansas City
[DE84-000302] N84-13842
Artificial intelligence techniques for industrial applications in job shop scheduling
[AD-A132164] N84-13867
PRODUCTION PLANNING
Investigation in the application of computer-aided process-planning techniques for mechanical engineering at Bendix Kansas City
[DE84-000302] N84-13842
PROGRAM VERIFICATION (COMPUTERS)
FASTBUS diagnostic language users manual, version 3(74)
[DE83-017932] N84-13837
Digital Equipment Corporation, VAX 11/750, VAL-11 COBOL version 2.2 (COBOL technical report)
[PB83-241596] N84-13851
IBM Corporation IBM4341 IBM BASIC release 1.0
[PB82-240945] N84-13852
Datapoint Corporation Datapoint 8800 RMS COBOL 2.3.A
[PB83-240962] N84-13853
Datapoint Corporation, Datapoint 8800, RMS COBOL 2.3.A
[PB83-241075] N84-13854
Northern Telecom, Incorporated NTI-585 ACOBOL/3 release 3
[PB83-241513] N84-13855
Hewlett Packard HP 3000 series 40, COBOL 11/3000 version A.00.09
[PB83-254805] N84-13858
Hewlett Packard HP 3000 series 40, COBOL 11/3000 version A.00.09 (COBOL technical report)
[PB83-254813] N84-13859
Benchmarking the join operations of relational database machines
[AD-A132312] N84-13861
PROJECT PLANNING
Proposed plan for joint research program between Japan, the USA and Canada concerning gas toxicity in fires N84-13378
PROP-FAN TECHNOLOGY
Technology and benefits of aircraft counter rotation propellers
[NASA-CR-168258] N84-13186
PROPANE
Thermal and hydraulic performance of a sieve-tray direct-contact heat exchanger
[DE84-000663] N84-13531
PROPELLANT COMBUSTION
A comment on the plateau combustion mechanism of the double-base propellants
[AD-A132551] N84-13333
PROPELLER BLADES
The compressible aerodynamics of rotating blades based on an acoustic formulation
[NASA-TP-2197] N84-13923
PROPELLERS
Power effects on the longitudinal characteristics on single-engine propeller-driven aircraft
[ARL-AERO-REPT-157] N84-13174
Technology and benefits of aircraft counter rotation propellers
[NASA-CR-168258] N84-13186
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-3, 208/May-June 1982
[ESA-TT-771] N84-13916
PROPORTIONAL COUNTERS
The development of an imaging gas scintillation proportional counter for use in X-ray astronomy N84-14079
PROPULSION
A laser-fusion rocket for interplanetary propulsion
[DE84-001238] N84-13219
PROPULSION SYSTEM CONFIGURATIONS
Some thoughts concerning large load-carrying vehicles
[NASA-TM-85701] N84-13139
Thrust-induced effects on subsonic longitudinal aerodynamic characteristics of a vectored-engine-over-wing configuration
[NASA-TP-2228] N84-13163
Effect of thrust reverser operation on the lateral-directional characteristics of a three-surface F-15 model at transonic speeds
[NASA-TP-2234] N84-13165
Study and review of permanent magnets for electric vehicle propulsion motors
[NASA-CR-168178] N84-14071
PROTECTIVE COATINGS
Intumescent reaction mechanisms: An analytic model
[AD-A132586] N84-13225
The electrodeposition of titanium coatings
[BLL-OA-TRANS-3057-(6196.3)] N84-13260
Current state of titanium coating methods
[BLL-OA-TRANS-3067-(6196.3)] N84-13268
Testing of epoxy-phenolic coating for lining carbon steel pipe
[DE84-90073] N84-13322
PROTON BEAMS
PR beam-pulse formation and control
[DE84-001354] N84-13936
Direct measurement of the energy spectrum of an intense proton beam
[DE84-000457] N84-13939
Proto-I axial-focusing experiments
[DE84-000458] N84-13951
ARCHSIM: A proton-synchrotron tracking program, including longitudinal space charge
[DE84-001335] N84-13952
Overview of ion-diode research
[DE83-017791] N84-14012
Study of defects produced in tungsten by 800-MeV protons using field-ion microscopy
[DE84-001359] N84-14048
PROTONS
Positive ion-molecule reactions in OCS/hydrocarbon mixtures
[AD-A132350] N84-13237
Proceedings of the Summer Workshop on Proton Decay Experiments
[DE83-009572] N84-13980
PROTOTYPES
Moltencarbonate fuel cells, development status
[DE84-000612] N84-13480
PSEUDONOISE
Application of pseudoinversion to linear system identification with discrete measurements
[AD-A132283] N84-13422
PSYCHOLOGICAL TESTS
The programming and validation of the computerised version of the intermediate mental alertness test
[CSIR-PERS-303] N84-13776
PSYCHOLOGY
A comparative study of the factors linking psychology and information science N84-14063
PUERTO RICO
The forest resources of Puerto Rico, Forest Service resource bulletin
[PB83-249995] N84-13665
PULSARS
Self-consistent magnetosphere for a static aligned rotator N84-14080
PULSE COMMUNICATION
Design issues in the GCF Mark 4 development N84-13415
PULSE COMPRESSION
A compact optical pulse compressor with computer-generated holographic masks for radar applications
[AD-A132152] N84-13430
PULSE GENERATORS
Pulsed-power diode generation of high-power microwaves
[DE84-001344] N84-13440
China builds first 6000kV type pulse voltage generator
[AD-A132564] N84-13449
PULSED LASERS
Laser-induced fluorescence spectroscopy for improved chemical analysis
[DE84-000629] N84-13243
Design of a high-brightness, low-jitter, short-pulse laser for plasma diagnostics
[DE84-000129] N84-13564
PULSED RADIATION
Pulsed-ion-irradiated microstructures in molybdenum
[DE84-000679] N84-13304
PULSES
Low-inductance, dual-feed diode development
[DE84-000117] N84-13465
PUMPS
Hydraulic hoisting and backfilling
[CSIR-ME-452] N84-13498
PURIFICATION
Fermilab satellite refrigerator compressors with the oil- and moisture-removal systems
[DE83-017328] N84-13386
PYROLYSIS
Current researches on fire retardant materials in Japan N84-13342
Fire and smoke retardants N84-13343

Q

QUADRATIC EQUATIONS
Absolutely unstable stimulated Brillouin scattering and 2-plasmon decay
[DE84-000823] N84-14032
QUADRATIC PROGRAMMING
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-4, 209/July-August 1982
[ESA-TT-781] N84-13141
QUADRUPOLES
Ideal of the perfect magnet-superconducting systems
[DE83-015080] N84-13482
QUALITATIVE ANALYSIS
Determination of a jet fuel metal deactivator by high performance liquid chromatography
[AD-A132220] N84-13336
QUALITY CONTROL
A guide for effluent radiological measurements at DOE installations
[DE83-016639] N84-13542

QUANTILES
A user's guide to ARSPtQ: The univariate time series analysis program for autoregressive spectral information quantile identification
[AD-A132217] N84-13831
QUANTITATIVE ANALYSIS
Determination of a jet fuel metal deactivator by high performance liquid chromatography
[AD-A132220] N84-13336
QUANTUM CHROMODYNAMICS
Meson-exchange Hamiltonian for NN scattering and isobar-nucleus dynamics
[DE83-017974] N84-13959
Theoretical perspectives on strange physics
[DE83-018085] N84-13965
The e+-e- collisions in the multi-TeV region
[DE84-000993] N84-13968
QUANTUM EFFICIENCY
Evaluation of Hamamatsu R1635 photomultiplier
[DE84-001252] N84-13468
QUANTUM MECHANICS
Quantum-mechanical calculations of the properties of liquid He droplets
[DE84-000164] N84-13220
Toward a constructive physics
[DE83-016644] N84-13919
QUANTUM THEORY
Theoretical studies of oxygen-iodine laser mechanisms and new laser concepts
[AD-A132374] N84-13550
QUARK PARTON MODEL
Interaction of a stream of dielectric spheres in an electric field in a high vacuum
[DE83-013695] N84-13958
Multiquark exotics
[DE83-017958] N84-13964
QUARTZ
Holographic optical elements with ultra-high spatial frequencies
[AD-A132355] N84-13537
QUARTZ CRYSTALS
Vibration resistant quartz crystal resonators
[AD-A132274] N84-13459
QUASARS
A very large array 1411 MHz radio survey: Properties of complete samples of radio and optically selected QSO candidates in a high galactic-latitude field N84-14076
Soft X-ray spectral observations of quasars and high X-ray luminosity Seyfert galaxies
[NASA-TM-85118] N84-14082
Extragalactic emission-line objects and the Michigan-Tololo survey N84-14101
QUENCHING (COOLING)
Dilatometric investigation of phase-transformation kinetics in HP 9-4-20 steel
[DE84-001180] N84-13280
QUERY LANGUAGES
Benchmarking the join operations of relational database machines
[AD-A132312] N84-13861

R

RADAR ECHOES
A composite analysis of a tropical squall-line system N84-13727
RADAR EQUIPMENT
Signal processor interface simulation of the AN/SPY-1A radar controller
[AD-A132170] N84-13429
RADAR IMAGERY
A simulation study of scene confusion factors in sensing soil moisture from orbital radar
[E84-10042] N84-13635
RADAR RANGE
Superregenerative amplifier in linear mode as a radar range gate-derivations
[DE84-000978] N84-13474
RADAR SCATTERING
Application of pseudoinversion to linear system identification with discrete measurements
[AD-A132283] N84-13422
RADAR TRACKING
Operational applications of military test ranges in space transportation system programs
[AD-A132535] N84-13217
RADIAL VELOCITY
Studies of cataclysmic variables N84-14084
RADIANCE
Air mass computer program for atmospheric transmittance/radiance calculation: FSCATM
[AD-A132108] N84-13712
RADIATION ABSORPTION
Calculation of atmospheric transmittance by IBM 3033 computer code LOWTRAN IIIB
[AD-A132123] N84-13989
RADIATION DAMAGE
Early mechanisms in radiation-induced biological damage
[DE84-001511] N84-13765
A simple model of space radiation damage in GaAs solar cells
[NASA-TP-2242] N84-13978
Neutron measurements and radiation damage calculations for fusion materials studies
[DE83-014790] N84-14011
Study of defects produced in tungsten by 800-MeV protons using field-ion microscopy
[DE84-001359] N84-14048
Radiation damage in silicon detectors
[DE84-001460] N84-14056
RADIATION DETECTORS
Proceedings of the Summer Workshop on Proton Decay Experiments
[DE83-009572] N84-13980
Radiation damage in silicon detectors
[DE84-001460] N84-14056
RADIATION DOSAGE
Radiation-induced phosphorus segregation in austenitic and ferritic alloys
[DE84-000903] N84-13302
Dislocation/obstacle interactions during low-dose irradiation creep of nickel
[DE84-001416] N84-13303
Early mechanisms in radiation-induced biological damage
[DE84-001511] N84-13765
RADIATION EFFECTS
Comparison of compression properties and swelling of beryllium irradiated at various temperatures
[DE84-000597] N84-13277
Microstructure of 9 Cr-1 MoVNb steel irradiated to 40 dpa at elevated temperatures in HFIR
[DE84-000339] N84-13285
Structural performance of ceramics in a high-fluence fusion environment
[DE84-001311] N84-13329
Origin of electron-bombardment enhanced reactivity of graphite with hydrogen
[DE83-017561] N84-13960
Comparison of measured and calculated helium production in nickel using newly evaluated neutron cross sections for (59)Ni
[DE84-000565] N84-14035
RADIATION HARDENING
Low-power radiation-hard GaAs RAM
[AD-A132325] N84-13457
ESD evaluation of radiation-hardened, high-reliability CMOS and MNOS ICs
[DE84-000138] N84-13481
Radiation hardening of oxygen-doped niobium by 14-MeV neutrons
[DE84-000103] N84-14026
RADIATION MEASUREMENT
Flame radiation and liner heat transfer in a tubular-can combustor
[NASA-TM-83538] N84-13188
RADIATION MEASURING INSTRUMENTS
Telescope calibration for gamma spectroscopy with a new Ge(Li) diode configuration
[INPE-2885-PRE/407] N84-14083
RADIATION PRESSURE
Nonlinear acoustics in a dispersive continuum: Random waves, radiation pressure, and quantum noise N84-13920
RADIATION SHIELDING
Field maintenance of radiation-shielding windows at HFEF
[DE83-015376] N84-13326
Space reactor system and subsystem investigations: Assessment of technology issues for the reactor and shield subsystem, SP-100 Program
[DE84-001566] N84-13979
Space-reactor system and subsystem investigations: Cost and schedule estimates for reactor and shield subsystems technology development. SP-100 program
[DE84-000112] N84-13984
RADIATION SOURCES
Surveys of globular cluster and galactic plane X-ray sources N84-14102
RADIATIVE HEAT TRANSFER
Recent progress at NBS in fire growth modeling N84-13372
FACET: A radiation-view-factor computer code for axisymmetric, 2D planar and 3D geometries with shadowing
[DE84-000359] N84-13835
Computer implementation, accuracy, and timing of radiation view-factor algorithms
[DE83-017618] N84-13849
RADIATIVE TRANSFER
In-flight absolute radiometric calibration of the thematic mapper
[E84-10044] N84-13637
FACET: A radiation-view-factor computer code for axisymmetric, 2D planar and 3D geometries with shadowing
[DE84-000359] N84-13835
Radiative transfer and photochemistry in the upper atmosphere of Jupiter N84-14095
RADIO ALTIMETERS
A position paper: Mesoscale oceanography from GEOSAT
[AD-A132292] N84-13749
RADIO ASTRONOMY
A very large array 1411 MHz radio survey: Properties of complete samples of radio and optically selected QSO candidates in a high galactic-latitude field N84-14076
RADIO BURSTS
Characteristics of gamma-ray line flares
[NASA-CR-174608] N84-14098
RADIO INTERFEROMETERS
The Telecommunications and Data Acquisition Report
[NASA-CR-174610] N84-13401
RADIO RECEIVERS
The 30 GHz communications satellite low noise receiver
[NASA-CR-168254] N84-13398
RADIO TELESCOPES
Results of the Australian geodetic VLBI experiment N84-13416
RADIO WAVES
Propagation of a radio-frequency pulsed signal over the Earth. The JOLLY programs
[DE84-000109] N84-13439
On the determination of the index of refraction of the atmosphere
[AD-A132107] N84-13713
RADIOACTIVE CONTAMINANTS
Code BETAL to calculation Alpha/Beta activities in environmental samples
[JEN-549] N84-13816
RADIOACTIVE DECAY
Physics at the proposed National Underground Science Facility
[DE84-001345] N84-13203
RADIOACTIVE WASTES
Mobility of organic complexes of nickel and cobalt in soils
[DE83-017897] N84-13720
RADIOACTIVITY
Code BETAL to calculation Alpha/Beta activities in environmental samples
[JEN-549] N84-13816
RADIOLOGY
Nuclear-medicine
[DE84-000346] N84-13759
RADIOLYSIS
Radiolysis of resist polymers. 2: Poly(haloalkylmethacrylates) and copolymers with methylmethacrylate
[AD-A132095] N84-13321
RADIOMETRIC RESOLUTION
LANDSAT 4 image data quality analysis
[E84-10036] N84-13629
The use of linear feature detection to investigate thematic mapper data performance and processing
[E84-10037] N84-13630
The use of thematic mapper data for land cover discrimination: Preliminary results from the UK SATMaP programme
[E84-10038] N84-13631
Analysis of multispectral scanner (MSS) and Thematic Mapper (TM) performance (pre-launch and post-launch)
[E84-10043] N84-13636
In-flight absolute radiometric calibration of the thematic mapper
[E84-10044] N84-13637
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E84-10050] N84-13643
RADIOSONDES
SRL tethersonde and echosonde data, Anderson Creek Valley, California
[DE84-001680] N84-13715
RAILGUN ACCELERATORS
Electrical and thermal modeling of railguns
[DE84-001361] N84-13387
RAIN
A numerical study of cloud and precipitation processes in mesoscale rainbands N84-13729

RAMAN SPECTRA
Evaluation of non-intrusive flow measurement techniques for a re-entry flight experiment
[NASA-CR-172142] N84-13212
N(2) and CO vibrational CARS and h(2) rotational CARS spectroscopy of CH(4)-N(2)O flames
[AD-A132234] N84-13238
Raman and fluorescent scattering by molecules embedded in small particles
[DE84-001278] N84-13937
RAMAN SPECTROSCOPY
N(2) and CO vibrational CARS and h(2) rotational CARS spectroscopy of CH(4)-N(2)O flames
[AD-A132234] N84-13238
Absolutely unstable stimulated Brillouin scattering and 2-plasmon decay
[DE84-000823] N84-14032
RANDOM ACCESS MEMORY
Low-power radiation-hard GaAs RAM
[AD-A132325] N84-13457
RANDOM PROCESSES
Superregenerative amplifier in linear mode as a radar range gate-derivations
[DE84-000978] N84-13474
RANDOM SAMPLING
The nature and analysis of random waves in shallow water. Part 1: Text and figures
[CSIR-RR-388/1-PT-1] N84-13496
The nature and analysis of random waves in shallow water. Part 2: Appendices
[CSIR-RR-388/2-PT-2] N84-13497
RANGELANDS
Evaluating proposed improvements of public rangelands
[PB83-251124] N84-13669
RANGES (FACILITIES)
Operational applications of military test ranges in space transportation system programs
[AD-A132535] N84-13217
Range reference atmosphere 0-70 km altitude
[AD-A132487] N84-13737
RANK TESTS
Asymptotic null and nonnull distributions of three multivariate test statistics in Gmanova
[TR-82] N84-13905
RANKINE CYCLE
Stirling-engine heat-actuated heat pump
[DE83-017137] N84-13529
RARE EARTH ELEMENTS
Microprobe analyses of rare-earth-element fractionation in meteoritic minerals
[DE83-017326] N84-14097
RATS
Adaptations to a high fat diet which increase exercise endurance in male rats N84-13755
RAY TRACING
A survey of underwater-acoustic ray tracing techniques
[PB83-250522] N84-13931
RAYLEIGH DISTRIBUTION
Vortex shedding and laser ablation
[DE84-000301] N84-13565
RAYLEIGH NUMBER
Calculation of natural convection within a heated enclosure using the method of second moments
[DE84-001596] N84-13517
Experimental study of three-dimensional natural convection at high Rayleigh number
[DE83-011982] N84-13530
REACTION KINETICS
Intumescent reaction mechanisms: An analytic model
[AD-A132586] N84-13225
CI: A computer program for calculation of contact indexes which will correct reaction rates evaluated by mean quantities during simulation of turbulent combustion
[DE84-001000] N84-13244
Surface science study of selective ethylene epoxidation catalyzed by the Ag(110) surface: Structural sensitivity
[DE84-001324] N84-13246
A comment on the plateau combustion mechanism of the double-base propellants
[AD-A132551] N84-13333
International Meeting on Lithium Batteries
[AD-A132371] N84-13455
Investigation of the dynamics and threshold behavior of endothermic negative ion-neutral reactions
[DE84-001369] N84-13975
REACTOR CORES
Relationships between strength, electrical conductivity, and density for oxidized PGX graphite
[DE83-016184] N84-13325
REACTOR DESIGN
Space reactor system and subsystem investigations: Assessment of technology issues for the reactor and shield subsystem, SP-100 Program
[DE84-001566] N84-13979
Plasma/neutral gas transport in divertors and limiters
[DE84-001594] N84-14034
REACTOR MATERIALS
Tensile and low-cycle fatigue measurements on cross-rolled tungsten at 1505 K
[DE84-000805] N84-13273
Structures and properties of rapidly solidified 9Cr-1Mo steel
[DE84-001276] N84-13276
Comparison of compression properties and swelling of beryllium irradiated at various temperatures
[DE84-000597] N84-13277
Grain boundary segregation and environmental degradation of a ferritic stainless steel
[DE83-016927] N84-13289
Modeling crack-growth processes in fusion-reactor materials
[DE84-000477] N84-13291
Influence of a flowing-lithium environment on the fatigue and tensile properties of type 316 stainless steel
[DE84-000611] N84-13295
Relationships between strength, electrical conductivity, and density for oxidized PGX graphite
[DE83-016184] N84-13325
Comparison of measured and calculated helium production in nickel using newly evaluated neutron cross sections for (59)Ni
[DE84-000565] N84-14035
REACTOR TECHNOLOGY
Separated isotopes: Vital tools for science and medicine
[DE83-011646] N84-13981
High-density Z-pinch research
[DE83-017311] N84-14013
Low-activation fusion-reactor design studies
[DE83-017688] N84-14014
d-d Tokamak reactor assessment
[DE83-016127] N84-14019
Background information and technical basis for assessment of environmental implications of magnetic fusion energy
[DE83-018300] N84-14030
Materials needs for compact fusion reactors
[DE84-001366] N84-14031
READ-ONLY MEMORY DEVICES
An EPROM-based function generator N84-13408
Polynomial driven time base and PN generator N84-13409
REAL TIME OPERATION
A real-time implementation of an advanced sensor failure detection, isolation, and accommodation algorithm
[NASA-TM-83553] N84-13140
Aethalometer: An instrument for the real-time measurement of optical absorption by aerosol particles
[DE84-000400] N84-13538
Real-time processing system for the NRL (Naval Research Laboratory) remote sensing experiment: Phelps Bank, July 1982
[AD-A132151] N84-13645
RECEIVERS
Intercontinental time and frequency transfer using a global positioning system timing receiver N84-13411
Optimum depth of propagation in shallow water
[AD-A132182] N84-13927
RECTANGULAR PLANFORMS
A rectangular gate merged MOSBJT
[AD-A132450] N84-13453
REDUCED GRAVITY
Microgravity silicon zoning investigation
[NASA-CR-170919] N84-13207
REDUNDANCY ENCODING
A real-time implementation of an advanced sensor failure detection, isolation, and accommodation algorithm
[NASA-TM-83553] N84-13140
REENTRY
Evaluation of non-intrusive flow measurement techniques for a re-entry flight experiment
[NASA-CR-172142] N84-13212
REENTRY SHIELDING
High altitude aerodynamic tests with simulated heat-shield outgassing
[AD-A132078] N84-13227
REFLECTANCE
Seasonal soybean crop reflectance
[E84-10049] N84-13642
Investigation of soft X-ray reflective coatings
[DE84-000510] N84-14025
REFRACTORY METALS
Replacing critical and strategic refractory metal elements in nickel-base superalloys --- NASA's COSAM program
[NASA-TM-83528] N84-13264
REFRIGERANTS
Vapor-phase heat-transport system
[DE84-001341] N84-13516
Development of a residential gas-absorption heat pump
[DE83-017218] N84-13526
REFRIGERATING MACHINERY
Fermilab satellite refrigerator compressors with the oil- and moisture-removal systems
[DE83-017328] N84-13386
Parametric testing and evaluation of a free-piston Stirling engine/linear-compressor system
[DE83-017282] N84-13590
REFRIGERATORS
A helium refrigerator with features for supercritical pressure cooling
[DE84-017759] N84-13383
Combined cold compressor/ejector helium-refrigerator cycle
[DE83-017764] N84-13385
A rotary vane open reversed Brayton cycle air conditioning and refrigeration system N84-13574
Forced two-phase cooling of the TPC superconducting solenoid
[DE83-017749] N84-14049
REGENERATIVE FUEL CELLS
Analysis of regenerative fuel cells
[NASA-CR-171783] N84-13671
REGENERATORS
Development of recuperator manufacturing techniques, phase 2
[AD-A132448] N84-13581
REGRESSION ANALYSIS
Selecting a subset of regression variables so as to maximize the prediction accuracy at a specified point
[CSIR-TWISK-275] N84-13903
REGULATIONS
Integrated logistic supportability (Aviation materiel)
[AD-A132367] N84-13148
Building systems and smoke control N84-13347
Temperature rise of handles and knobs
[BLL-OA-TRANS-3047-(6196.3)] N84-13502
A guide for effluent radiological measurements at DOE installations
[DE83-016639] N84-13542
Deregulating the airlines: An economic analysis
[PB83-250019] N84-14070
REINFORCEMENT (STRUCTURES)
Detection of cracks on highway pavements
[PB83-238204] N84-13389
RELATIVISTIC EFFECTS
The 3-body forces, relativistic effects, isobars, and pions in nuclear systems
[DE84-000163] N84-13938
Linear relativistic gyrokinetic equation in general magnetically confined plasmas
[DE84-000048] N84-14027
RELATIVISTIC ELECTRON BEAMS
Thomson-scattering measurements of electron temperature and density in a plasma channel created by a relativistic electron beam
[DE84-000356] N84-13940
Simulation studies on a novel betatron injection scheme
[DE84-001337] N84-13946
Tomographic technique in relativistic electron beam experiments
[DE84-000357] N84-13949
Motion of ionized electrons under the intense electromagnetic field of the beam
[DE84-001396] N84-13955
Relativistic-beam pickup test facility
[DE83-017929] N84-13962
Grad-B drift transport of high current electron beams
[DE84-000115] N84-13977
Simulations of the effects of mobile ions on the relativistic beam-plasma instability for intense beams
[DE84-000369] N84-14003
RELATIVISTIC PARTICLES
Low-inductance, dual-feed diode development
[DE84-000117] N84-13465
Filamentation instability of ion acoustic waves driven by a scattered relativistic beam
[DE84-001323] N84-13956
RELATIVISTIC PLASMAS
Energetic plasma-beam propagation in weak and strong magnetic fields
[DE84-001362] N84-14005
RELAXATION (MECHANICS)
Relaxation in spin glasses: Similarities and differences from ordinary glasses
[DE84-001719] N84-13330
RELIABILITY
A general framework for learning curve reliability growth models
[AD-A132277] N84-13596
Representativeness of meteorological observations
[DE83-017699] N84-13743

Decision making and information processing under various uncertainty conditions
[AD-A132051] N84-13770
RELIABILITY ENGINEERING
A technical overview of the National Software Works
[AD-A132320] N84-13827
REMOTE SENSING
Real-time processing system for the NRL (Naval Research Laboratory) remote sensing experiment: Phelps Bank, July 1982
[AD-A132151] N84-13645
Rain estimation from satellites: An examination of the Griffith-Woodley technique
[NASA-TM-84969] N84-13735
Instrumentation for remote sensing over fiber optics
[DE84-001788] N84-13991
REMOTELY PILOTED VEHICLES
A preliminary study of solar powdered aircraft and associated power trains
[NASA-CR-3699] N84-13194
REMOVAL
Electrolytic gettering of tritius from air
[DE84-000174] N84-13252
REPETITION
Methods of optimizing parameters of mechanisms performing repeated brief operations
[BLL-M-35352] N84-13575
REPORTS
Fourth Europhysical Conference on Lattice Defects in Ionic Crystals
[AD-A132387] N84-14039
RESCUE OPERATIONS
Escape and rescue model N84-13361
RESEARCH
Review of astrophysical research at Los Alamos
[DE83-017304] N84-14091
RESEARCH AND DEVELOPMENT
A proposed RF-technology R/D plan for the United States
[DE84-000643] N84-13434
Research, development and demonstration of lead-acid batteries for electric vehicle propulsion
[DE84-000468] N84-13464
Assessment of the adequacy of US accelerator technology for Department of Energy Missions
[DE84-001632] N84-13945
RESEARCH FACILITIES
Overview of composites capability at Lawrence Livermore National Laboratory
[DE84-001086] N84-13228
Large laser system facility design
[DE84-000159] N84-13553
Pressure system recertification at NASA-Langley Research Center
[NASA-TM-85733] N84-13576
RESEARCH MANAGEMENT
Proposed plan for joint research program between Japan, the USA and Canada concerning gas toxicity in fires N84-13378
RESEARCH PROJECTS
Laser-induced fluorescence spectroscopy for improved chemical analysis
[DE84-000629] N84-13243
Photovoltaic-cell-reseach priorities
[DE84-000066] N84-13683
Double beta decay: Recent developments and projections
[DE84-000476] N84-13944
RESERVOIRS
Stream-water storage in the ocean using an impermeable membrane
[PB83-248369] N84-13394
RESIDENTIAL ENERGY
Development of a residential gas-absorption heat pump
[DE83-017218] N84-13526
County-level wind resource estimates for DOE Region 5
[DE84-000009] N84-13744
RESIDUAL STRESS
Welding deformations and residual stresses due to circumferential welding of cylindrical shells and hemispherical end plates
[DRIC-T-6968] N84-13602
RESOLUTION
Proceedings of the Seventh International Conference on High Voltage Electron Microscopy
[DE83-016323] N84-13540
RESONANCE
Laser-plasma interaction at 10.6 microns
[DE84-001038] N84-13560
An analysis of acoustic and seismic wave resonances N84-13701
Resonance-resonance coupling in dissociative electron attachment
[DE84-001767] N84-13972
RESONANT FREQUENCIES
Blade loss transient dynamics analysis with flexible bladed disk
[NASA-CR-168176] N84-13193
An improved finite-difference analysis of uncoupled vibrations of tapered cantilever beams
[NASA-TM-83495] N84-13610
RESONATORS
Vibration resistant quartz crystal resonators
[AD-A132274] N84-13459
RESOURCES MANAGEMENT
The forest resources of Puerto Rico, Forest Service resource bulletin
[PB83-249995] N84-13665
Forest statistics for southeast Alabama counties, Forest Service resource bulletin
[PB83-250753] N84-13666
Forest statistics for west central Alabama counties, Forest Service resource bulletin
[PB83-249961] N84-13668
RESPIRATION
Smoke inhalation injury N84-13350
Human behavior N84-13351
Studies of emotional instability in smoke from fires: Decrease of thinking powers and of memory in fire smoke N84-13355
RESPIRATORY DISEASES
Respiratory effects on population from low-level exposures to ozone
[PB83-246132] N84-13774
RESPIRATORY PHYSIOLOGY
Respiratory effects on population from low-level exposures to ozone
[PB83-246132] N84-13774
RESPIRATORY SYSTEM
Study of biological samples obtained from victims of MGM Grand Hotel fire N84-13374
RESPONSE BIAS
The BJT-JFET: A novel merged device structure
[AD-A132373] N84-13454
REVERSE FIELD PINCH
Study on diffusion of the vertical magnetic field in the toroidal stabilizing shell of the ZT-40M reversed-field-pinch device
[DE83-016353] N84-14023
REVERSED FLOW
Reverse combustion along constant geometry fissures in heterogeneous fuels N84-13232
REYNOLDS NUMBER
Experiments on mixing and combustion with low heat release in a turbulent shear flow N84-13489
RHEOLOGY
The effect of surface charge on the rheology of concentrated aqueous quartz suspensions
[CSIR-CENG-423] N84-13235
Processing science for AS/3501-6 carbon/epoxy composites
[AD-A132323] N84-13316
Improved polymers for enhanced-oil-recovery synthesis and rheology
[DE83-017371] N84-13324
RIEMANN MANIFOLD
The specific solutions of a uniform algebraic differential equation of the second order
[ISSN-0066-1953] N84-13783
Positive biharmonic functions N84-13786
RIMS
The dynamic in plane response at the centre of a rotating elastic disc due to oscillatory in plane forces at the rim
[ISVR-TR-121] N84-13613
RING STRUCTURES
Precision support of annular optics
[DE83-017473] N84-13993
ROBOTS
Kinematic equations for resolved-rate control of an industrial robot arm
[NASA-TM-85685] N84-13866
ROCKET NOZZLES
Internal pressure distributions for a two-dimensional thrust-reversing nozzle operating at a free-stream Mach number of zero
[NASA-TM-85655] N84-13161
ROCKET-BORNE INSTRUMENTS
Sounding rocket XUV observations of Capella N84-14078
ROCKETS
A laser-fusion rocket for interplanetary propulsion
[DE84-001238] N84-13219
ROCKS
Instruction manual for the use of the CSIR triaxial rock stress measuring equipment
[CSIR-ME-1763] N84-13535
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E84-10050] N84-13643
Geology of carbonate aggregate resources of Illinois, Illinois mineral notes
[PB83-251140] N84-13725
ROLL FORMING
Calculation of the life of components of metallurgical equipment from the parameter of failure probability
[BLL-M-35351-(5828.4F)] N84-13594
ROLLER BEARINGS
Thermomechanical processing of M-50 steel
[AD-A132272] N84-13271
ROLLING CONTACT LOADS
Measurement of rolling friction by a damped oscillator
[NASA-TP-2257] N84-13577
ROTARY WINGS
La Recherche Aerospatiale, Biomonthly Bulletin, no. 1982-4, 209/July-August 1982
[ESA-TT-781] N84-13141
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-5, 210/September-October 1982
[ESA-TT-785] N84-13142
ROTATING BODIES
An experimental evaluation of the thermal performance of a rotating heat pipe with internal axial fins
[AD-A132553] N84-13504
The compressible aerodynamics of rotating blades based on an acoustic formulation
[NASA-TP-2197] N84-13923
ROTATING CYLINDERS
Complex eigenvalues for the stability of Couette flow
[NASA-CR-172251] N84-13492
ROTATING DISKS
The dynamic in plane response at the centre of a rotating elastic disc due to oscillatory in plane forces at the rim
[ISVR-TR-121] N84-13613
ROTATION
An analysis of smooth and axially finned, rotating heat pipe condensers
[AD-A132141] N84-13509
On the range of real coefficients of functions with bounded boundary rotation N84-13789
Solution of the 2-point boundary value problems of optimal spacecraft rotational maneuvers N84-13870
ROTOR AERODYNAMICS
Preliminary results of the first static calibration of the RSRA helicopter active-isolator rotor balance system
[NASA-TM-84395] N84-13178
The compressible aerodynamics of rotating blades based on an acoustic formulation
[NASA-TP-2197] N84-13923
ROTOR BLADES
Preliminary results of the first static calibration of the RSRA helicopter active-isolator rotor balance system
[NASA-TM-84395] N84-13178
ROTOR SYSTEMS RESEARCH AIRCRAFT
Rotor systems research aircraft: Fixed-wing simulations results
[NASA-TM-85863] N84-13176
Flight testing the Rotor Systems Research Aircraft (RSRA)
[NASA-TM-85852] N84-13177
Preliminary results of the first static calibration of the RSRA helicopter active-isolator rotor balance system
[NASA-TM-84395] N84-13178
ROTORS
Flight testing the Rotor Systems Research Aircraft (RSRA)
[NASA-TM-85852] N84-13177
Flywheel rotor and containment technology development, FY83
[DE83-017615] N84-13589
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-3, 208/May-June 1982
[ESA-TT-771] N84-13916
ROUTES
Asymptotic optimality of shortest path routing
[AD-A132280] N84-13423
RUBIDIUM ISOTOPES
Atomic-beam density determination from laser-induced fluorescence interval distributions
[DE84-000677] N84-13571
RUDDERS
Effect of thrust reverser operation on the lateral-directional characteristics of a three-surface F-15 model at transonic speeds
[NASA-TP-2234] N84-13165
RUPTURING
Statistical analysis of Kevlar 49/epoxy composite stress-rupture data
[DE84-000516] N84-13230
Mechanisms of elevated-temperature rupture in single-phase ceramics
[DE83-017779] N84-13327
RURAL LAND USE
Evaluating proposed improvements of public rangelands
[PB83-251124] N84-13669

S

SAFETY
A study on sound guidance for evacuation: Effect of megaphoned evacuation guidance in smoke N84-13356
Slippery versus slip resistant work surfaces: The background for a regulatory definition [PB83-243634] N84-13392
Safety studies on Li/SOCl-2 reserve battery [AD-A132279] N84-13458
Annotated bibliography of battery evaluations [DE84-000653] N84-13466
SAFETY DEVICES
Proceedings of the 6th Joint Panel Meeting: UJNR Panel on Fire Research and Safety N84-13341
Sprinklers N84-13345
Automatic sprinklers N84-13346
Building systems and smoke control N84-13347
SAFETY MANAGEMENT
Building systems and smoke control N84-13348
Present state of research in Japan on toxicities of gases during fire N84-13349
Smoke inhalation injury N84-13350
Human behavior N84-13351
Recent Japanese progress in fire modeling N84-13353
Programmer's manual for the fire safety evaluation system cost minimizer computer program [PB83-251447] N84-13395
SALT BATHS
Fluidized-bed and salt-bath heat treating (AISI 4130 and 4340 alloy steels) [DE84-000979] N84-13290
SAMPLING
A guide for effluent radiological measurements at DOE installations [DE83-016639] N84-13542
Characterization of reactants, reaction mechanisms and reaction products leading to extreme acid rain and acid aerosol conditions in southern California [PB83-252825] N84-13697
Representativeness of meteorological observations [DE83-017699] N84-13743
Life histories and monitoring strategies: Some lessons from field experience [DE83-016164] N84-13763
SATELLITE ATTITUDE CONTROL
Simulation and analysis of low altitude terrestrial satellites [INPE-2754-PRE/330] N84-13209
Study of auxiliary propulsion requirements for large space systems, volume 2 [NAA-CR-166193] N84-13218
SATELLITE LIFETIME
A position paper: Mesoscale oceanography from GEOSAT [AD-A132292] N84-13749
SATELLITE OBSERVATION
Postglacial rebound observed by Lageos and the effective viscosity of the lower mantle [NASA-TM-84982] N84-13705
Satellite observations of variations in southern hemisphere snow cover [PB83-252908] N84-13745
Economic benefits of operational environmental satellites [PB83-252932] N84-13748
SATURN (PLANET)
Origin and evolution of the Saturn system [NASA-TM-85847] N84-14096
SATURN RINGS
Origin and evolution of the Saturn system [NASA-TM-85847] N84-14096
SCALING LAWS
Scaling laws on fire spread N84-13368
Analysis of stability and symmetry implications for ICF [DE84-000640] N84-13556
Conceptual design of a 300-GeV accelerator based on the inverse free-electron laser mechanism [DE84-001471] N84-13969
SCATTERING
Splines and the Galerkin method for solving the integral equations of scattering theory [CSIR-TWISK-267] N84-13873
Toward a constructive physics [DE83-016644] N84-13919
SCATTERING AMPLITUDE
Recent developments in the understanding of pion-nucleus scattering [DE84-001017] N84-13942
SCATTERING CROSS SECTIONS
A study of thick-target X-ray spectra using photonuclear reactions [AD-A132543] N84-13934
Meson-exchange Hamiltonian for NN scattering and isobar-nucleus dynamics [DE83-017974] N84-13959
Neutron total cross section measurements in the energy region from 47 keV to 20 MeV [DE84-001400] N84-13970
SCATTERING FUNCTIONS
The quantum hall effect N84-14036
SCHEDULING
Artificial intelligence techniques for industrial applications in job shop scheduling [AD-A132164] N84-13867
SCIENTISTS
Review of astrophysical research at Los Alamos [DE83-017304] N84-14091
SCINTILLATION
Aperture averaging of scintillation for space-to-ground optical communication applications [AD-A132198] N84-13428
SCINTILLATION COUNTERS
The development of an imaging gas scintillation proportional counter for use in X-ray astronomy N84-14079
SEA ICE
Ocean mixing and circulation response in the marginal ice zone [AD-A132174] N84-13751
SEALS (STOPPERS)
Wear during rubbing of a sintered metal powder body [AD-A132354] N84-13584
SEDIMENTS
Phase and compression behavior in sedimentation and thickening of liquid-solid suspensions [PB83-249664] N84-13257
Assessment of quality of data on tapes from the hydrogeochemical and stream sediment reconnaissance [DE83-017697] N84-13647
Dynamic mass balance of PCB (polychlorinated biphenyls) and suspended solids in Saginaw Bay: A case study [PB83-250308] N84-13699
SEGMENTS
The FASTBUS segment driver microcode description [DE83-017972] N84-13437
SEISMIC WAVES
Lateral-torsional response of structures subjected to seismic waves [PB83-239582] N84-13390
Microseismic monitoring for evidence of geothermal heat in the capital district of New York [PB83-248807] N84-13659
An analysis of acoustic and seismic wave resonances N84-13701
Nevada test site seismic-telemetry measurements [DE84-000447] N84-13719
SEISMOGRAPHS
Marine seismic System(MSS) deployment. Phase IV: Investigation of techniques and deployment scenarios for installation of tri-axial seismometer in a borehole in the deep ocean [AD-A132300] N84-13710
SEISMOLOGY
Summaries of physical research in the geosciences [DE83-017885] N84-13624
Seismic investigation of the Multi-Well Experiment site [DE84-000943] N84-13655
SELECTION
Selecting a subset of regression variables so as to maximize the prediction accuracy at a specified point [CSIR-TWISK-275] N84-13903
SELF CONSISTENT FIELDS
Self-consistent magnetosphere for a static aligned rotator N84-14085
SEMANTICS
SISAL: Streams and Iteration in a Single-Assignment Language. Language reference manual, version 1.1 [DE83-016576] N84-13843
Specification and interpretation of data model semantics: An integration of two approaches [PB83-249714] N84-13856
SEMICONDUCTOR DIODES
An FET full-bridge switcher for inductorless capacitor charging for Nova [DE83-018005] N84-13471
SEMICONDUCTOR JUNCTIONS
A simple model of space radiation damage in GaAs solar cells [NASA-TP-2242] N84-13978
SEMICONDUCTORS (MATERIALS)
Effects of simultaneous phosphorus and arsenic diffusions on emitter push and dislocation generation [AD-A132331] N84-14042
Dynamic aspects of the dye-sensitized photoconductivity of semiconductors [DE84-001132] N84-14059
Research activities that occurred in the Coordinated Science Laboratory for July 1, 1982 through Jun 30, 1983 [AD-A132132] N84-14108
SENSITIVITY
The transient response of circular foil heat-flux gages [DE83-017785] N84-13541
SENSORS
Airborne Intelligent Display (AID) phase 1 software development [ATC-123] N84-13181
Relativistic-beam pickup test facility [DE83-017929] N84-13962
SEPARATION
Radiation-induced phosphorus segregation in austenitic and ferritic alloys [DE84-000903] N84-13302
SERIES EXPANSION
Application of the implicit Fourier-expansion method to the calculation of three-dimension equilibria by the iterative method [DE83-017621] N84-13902
SERVICE LIFE
Development of a circulating zinc-bromine battery, phase 2 [DE84-001886] N84-13463
Solid-oxide fuel cells [DE83-017925] N84-13469
Analysis of lead-acid battery accelerated testing data [DE83-017403] N84-13473
Cell-substrate bonding system design and development [DE84-000963] N84-13678
SERVOMECHANISMS
Simulator study of pilot-aircraft-display system response obtained with a three-dimensional-box pictorial display [NASA-TP-2122] N84-13182
SEX
Cognitive components underlying the digit symbol test [PB83-250464] N84-13779
SEYFERT GALAXIES
Soft X-ray spectral observations of quasars and high X-ray luminosity Seyfert galaxies [NASA-TM-85118] N84-14082
Extragalactic emission-line objects and the Michigan-Tololo survey N84-14101
SHALE OIL
Stress-wave experiments on selected crustal rocks and minerals [DE84-001613] N84-13714
SHALLOW WATER
The nature and analysis of random waves in shallow water. Part 1: Text and figures [CSIR-RR-388/1-PT-1] N84-13496
The nature and analysis of random waves in shallow water. Part 2: Appendices [CSIR-RR-388/2-PT-2] N84-13497
A Numerov-Galerkin technique applied to a finite element shallow-water equations model with enforced conservation of integral invariants and selective lumping [CSIR-TWISK-276] N84-13878
Optimum depth of propagation in shallow water [AD-A132182] N84-13927
SHAPE MEMORY ALLOYS
Characterization of the structure and substructure of thermally transformation cycled Cu-Zn-Al shape memory alloys [AD-A132341] N84-13270
SHAPES
Interactive surface visualization using raster graphics [AD-A132548] N84-13819
SHEAR FLOW
Experiments on mixing and combustion with low heat release in a turbulent shear flow N84-13489
The disturbance flow field produced by an evolving vortex [NASA-TP-2245] N84-13500
SHEAR PROPERTIES
Cell-substrate bonding system design and development [DE84-000963] N84-13678
SHEAR STRESS
Investigation of the wall pressure, wall shear stress and velocity fields associated with a turbulent spot in a laminar boundary layer N84-13488
The propagation and arrest of an edge crack in an elastic half-space under conditions of anti-plane shear: Analytical and numerical results N84-13604
SHEATHS
Approach to single-molecule detection by laser-induced fluorescence [DE84-001338] N84-13572
SHIFT REGISTERS
Polynomial driven time base and PN generator N84-13409

SHOCK LAYERS
Large scale galactic shocks and motions of the cloud medium N84-14089
SHOCK LOADS
Simulation of shock-induced energy flux in molecular solids
[DE84-001157] N84-14047
SHOCK TUNNELS
A new operation method for a large-scale shock tunnel
[NAL-TR-765] N84-13200
SHOCK WAVE INTERACTION
Shock induced molecular excitation in solids
[AD-A132236] N84-13935
Simulation of shock-induced energy flux in molecular solids
[DE84-001157] N84-14047
SHOCK WAVES
Aluminum as a global high-pressure equation-of-state standard
[DE84-000153] N84-13287
SHOES
Slippery versus slip resistant work surfaces: The background for a regulatory definition
[PB83-243634] N84-13392
SHOPS
Artificial intelligence techniques for industrial applications in job shop scheduling
[AD-A132164] N84-13867
SHORT TAKEOFF AIRCRAFT
Thrust-induced effects on subsonic longitudinal aerodynamic characteristics of a vectored-engine-over-wing configuration
[NASA-TP-2228] N84-13163
Flight-test of the glide-slope track and flare-control laws for an automatic landing system for a powered-lift STOL airplane
[NASA-TP-2128] N84-13198
SIGNAL PROCESSING
Polynomial driven time base and PN generator N84-13409
White light signal processing with the application to spread spectrum communications
[AD-A132418] N84-13417
Algorithms for single-signal and multisignal minimum-cross-entropy spectrum analysis
[AD-A132400] N84-13420
Application of pseudoinversion to linear system identification with discrete measurements
[AD-A132263] N84-13422
Signal processor interface simulation of the AN/SPY-1A radar controller
[AD-A132170] N84-13429
Low-power radiation-hard GaAs RAM
[AD-A132325] N84-13457
SIGNAL TO NOISE RATIOS
Algorithms for single-signal and multisignal minimum-cross-entropy spectrum analysis
[AD-A132400] N84-13420
Optimum depth of propagation in shallow water
[AD-A132182] N84-13927
SIGNIFICANCE
Algorithm for computing significance levels using the Kolmogorov-Smirnov statistic and valid for both large and small samples
[DE84-001586] N84-13909
SILANES
Effect of silane fraction on the optoelectronic and photovoltaic properties of RF-glow-discharge a-Si:H prepared from SiH4 + H2 mixtures
[DE83-016730] N84-14058
SILICON
Microgravity silicon zoning investigation
[NASA-CR-170919] N84-13207
Development and fabrication of a high current, fast recovery power diode
[NASA-CR-168196] N84-13443
Collapsible photovoltaic-concentrator array portable power from the Sun
[DE84-000713] N84-13677
Effects of compensation on light-induced metastable defects in aSi:H
[DE83-016696] N84-13680
Update of pulsed-laser processing technology for high-efficiency silicon solar cells
[DE84-000638] N84-13684
Radiation damage in silicon detectors
[DE84-001460] N84-14056
SILICON CARBIDES
Characterization of ceramic vane materials for 10KW turboalternator
[AD-A132505] N84-13196
SILICON NITRIDES
Characterization of ceramic vane materials for 10KW turboalternator
[AD-A132505] N84-13196
Tensile strength of pressureless-sintered silicon nitride at elevated temperature
[NAL-TR-753] N84-13611
SILICON OXIDES
Characterization of high-temperature vapor-phase species and vapor-solid interactions of import to combustion and gasification processes in the energy technologies
[DE83-015166] N84-13242
SILICONES
Design analysis of advanced photovoltaic technologies
[DE84-000008] N84-13675
SILVER
Surface science study of selective ethylene epoxidation catalyzed by the Ag(110) surface: Structural sensitivity
[DE84-001324] N84-13246
Copper-manganese-base silverless brazing systems
[PB83-250100] N84-13593
SILVER HALIDES
The 1982 International Congress of Photographic Science
[AD-A132372] N84-13536
SIMULATION
Emergency evacuation flow models N84-13360
Signal processor interface simulation of the AN/SPY-1A radar controller
[AD-A132170] N84-13429
A simulation study of scene confusion factors in sensing soil moisture from orbital radar
[E84-10042] N84-13635
Using simulation to estimate first passage distributions
[AD-A132328] N84-13898
SIMULATORS
Fields and currents and charges on obstacles in a parallel-plate simulator at selected frequencies and with pulse excitation
[AD-A132406] N84-13418
SINGLE CRYSTALS
Microgravity silicon zoning investigation
[NASA-CR-170919] N84-13207
NdP5O14 crystal used for miniature rangefinder
[AD-A132541] N84-13549
Preparation of infrared optic fibers using new materials
[AD-A132311] N84-13988
SINGULARITY (MATHEMATICS)
On the singularities of certain nonlinear partial differential equations N84-13787
Generalized composite integration rules in the presence of a singularity
[CSIR-TWISK-272] N84-13876
Multivariate, minimum-curvature splines for randomly spaced data
[AD-A132319] N84-13899
SINTERING
Characterization of ceramic vane materials for 10KW turboalternator
[AD-A132505] N84-13196
Wear during rubbing of a sintered metal powder body
[AD-A132354] N84-13584
Tensile strength of pressureless-sintered silicon nitride at elevated temperature
[NAL-TR-753] N84-13611
SITE SELECTION
Survey of water quality and flow in Maryland coastal zone streams: A data report
[PB83-249375] N84-13660
Ecological Research Division marine research program
[DE83-017880] N84-13691
SIZE DISTRIBUTION
Aerosol size distribution using the extinction-sedimentation inversion technique
[AD-A132158] N84-13711
SKIN FRICTION
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-3, 208/May-June 1982
[ESA-TT-771] N84-13916
SLABS
Use of numerical heat-transfer techniques to analyze thermal-comparator conductivity measurements
[DE84-000945] N84-13515
SLIDING
Slippery versus slip resistant work surfaces: The background for a regulatory definition
[PB83-243634] N84-13392
Investigation of the generation of regular waves by a sliding valve pneumatic wave generator
[CSIF-RR-553] N84-13579
SLIDING FRICTION
Surface contact wear and abrasive wear in lubricated sliding mechanisms N84-13573
Measurement of friction and wear on modified surfaces
[AD-A132364] N84-13583
SLIP
Slippery versus slip resistant work surfaces: The background for a regulatory definition
[PB83-243634] N84-13392
SLOPES
Reflection and identification studies applied to terrain imaging radar
[AD-A132401] N84-13419
SLURRIES
Fischer-Tropsch synthesis in slurry reactors: Summary and analysis of the state of the art
[CSIR-CENG-432] N84-13234
SMOKE
Proceedings of the 6th Joint Panel Meeting: UJNR Panel on Fire Research and Safety N84-13341
Fire and smoke retardants N84-13343
Building systems and smoke control N84-13348
Smoke inhalation injury N84-13350
Human behavior N84-13351
Human behavior N84-13352
Studies of emotional instability in smoke from fires: Decrease of thinking powers and of memory in fire smoke N84-13355
A study on sound guidance for evacuation: Effect of megaphoned evacuation guidance in smoke N84-13356
On smoke control experiments N84-13379
SNOW
Satellite observations of variations in southern hemisphere snow cover
[PB83-252908] N84-13745
SNOW COVER
In-flight absolute radiometric calibration of the thematic mapper
[E84-10044] N84-13637
Satellite observations of variations in southern hemisphere snow cover
[PB83-252908] N84-13745
Economic benefits of operational environmental satellites
[PB83-252932] N84-13748
SODAR
A comparison of frequency determination using real sodar data
[DE83-017942] N84-13718
SODIUM CHLORIDES
Development of multicomponent transport theory and transport data for membranes in concentrated electrolytes
[DE84-001846] N84-13249
SODIUM COMPOUNDS
Principles of superionic conduction
[DE84-001215] N84-14044
SODIUM HYDROXIDES
Characterization of high-temperature vapor-phase species and vapor-solid interactions of import to combustion and gasification processes in the energy technologies
[DE83-015166] N84-13242
SOFTWARE ENGINEERING
Formal techniques in the management of software design
[AD-A132569] N84-13818
SOFTWARE TOOLS
Tools for the creation of IMS database designs from Entity-Relationship diagrams
[DE84-000592] N84-14066
SOIL MOISTURE
Models of simultaneous heat and moisture transfer in soils
[DE84-001580] N84-13513
A simulation study of scene confusion factors in sensing soil moisture from orbital radar
[E84-10042] N84-13635
Application of remote sensing to hydrological problems and floods
[E84-10046] N84-13639
Seasonal soybean crop reflectance
[E84-10049] N84-13642
SOILS
Aerial radiological survey of Area 11, Nevada Test Site
[DE84-000440] N84-13650
Mobility of organic complexes of nickel and cobalt in soils
[DE83-017897] N84-13720
SOLAR CELLS
Design analysis of advanced photovoltaic technologies
[DE84-000008] N84-13675
Collapsible photovoltaic-concentrator array portable power from the Sun
[DE84-000713] N84-13677
Cell-substrate bonding system design and development
[DE84-000963] N84-13678

Design and development of a high-concentration and high-effiecency photovoltaic concentrator using a curved Fresnel lens
[DE84-000967] N84-13679
Effects of compensation on light-induced metastable defects in aSi:H
[DE83-016698] N84-13680
Photovoltaic-cell-reseach priorities
[DE84-000066] N84-13683
Update of pulsed-laser processing technology for high-efficiency silicon solar cells
[DE84-000638] N84-13684
Photovoltaic concentrators: Recent developments
[DE84-001641] N84-13687
A simple model of space radiation damage in GaAs solar cells
[NASA-TP-2242] N84-13978

SOLAR COLLECTORS
Vapor-phase heat-transport system
[DE84-001341] N84-13516
Structural analysis of a glass/space frame parabolic-trough solar collector for various operating positions
[DE84-001137] N84-13622
Collapsible photovoltaic-concentrator array portable power from the Sun
[DE84-000713] N84-13677
Flat-plate solar-collector performance data base and user's manual
[DE83-011993] N84-13682

SOLAR CORONA
The MHD stability of inertia-tied Z-pinches with application to solar coronal loops N84-13932

SOLAR ENERGY
Annotated bibliography of battery evaluations
[DE84-000653] N84-13466
Collapsible photovoltaic-concentrator array portable power from the Sun
[DE84-000713] N84-13677
Chemical conversion surfaces for solar-energy applications
[DE84-000107] N84-13681

SOLAR ENERGY ABSORBERS
Evaluation of selective solar-absorber surfaces, phase 2
[DE84-000067] N84-13685

SOLAR FLARES
Characteristics of gamma-ray line flares
[NASA-CR-174608] N84-14098

SOLAR NEUTRINOS
Physics at the proposed National Underground Science Facility
[DE84-001345] N84-13203

SOLAR POWERED AIRCRAFT
A preliminary study of solar powdered aircraft and associated power trains
[NASA-CR-3699] N84-13194

SOLAR RADIATION
Impact of enhanced solar UV-B radiation upon the marine ecosystem
[PB83-247411] N84-13694
Yields photosynthetic efficiencies, and proximate chemical composition of dense cultures of marine microalgae, a subcontract report
[DE83-011992] N84-13757

SOLAR REFLECTORS
Baffle system employing reflective surfaces
[NASA-TM-84406] N84-13985

SOLENOIDS
Cryogenic testing of the TPC superconducting solenoid
[DE84-000528] N84-13467

SOLID ELECTROLYTES
Solid-oxide fuel cells
[DE83-017925] N84-13469

SOLID STATE LASERS
High energy efficient solid state laser sources --- slab geometry laser sources
[NASA-CR-174606] N84-13548
Infant-mortality testing of high-energy-density capacitors used on Nova
[DE83-018027] N84-14028

SOLID SUSPENSIONS
Phase and compression behavior in sedimentation and thickening of liquid-solid suspensions
[PB83-249664] N84-13257

SOLID-SOLID INTERFACES
Galvanic coupling between D6AC steel, 6061-T6 aluminum, Inconel 718 and graphite-epoxy composite material: Corrosion occurrence and prevention
[NASA-TP-2236] N84-13263

SOLIDIFICATION
Characterization of the general purpose research furnace for low-G directional solidification experiments
[NASA-TM-85718] N84-13211
Formation of structure of low-alloy steel inoculated with rare-earth metals and alkaline-earth metals
[BLL-M-35321] N84-13258
Structures and properties of rapidly solidified 9Cr-1Mo steel
[DE84-001276] N84-13276
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 3. A model for the effect of titanium addition
[DE84-001296] N84-13281
Modeling binary-alloy solidification processes: Numerical implementation
[DE84-001587] N84-13284
Segregation and domain structure in rapidly solidified Ni3Al
[DE83-017188] N84-13306

SOLIDS
Hydraulic hoisting and backfilling
[CSIR-ME-452] N84-13498
Use of numerical heat-transfer techniques to analyze thermal-comparator conductivity measurements
[DE84-000945] N84-13515
Shock induced molecular excitation in solids
[AD-A132236] N84-13935
Solid-State Division
[DE84-000296] N84-14045
Prediction of high-pressure phase transitions in solid N2 and the pressure dependence of the intramolecular vibrational frequencies
[DE83-015260] N84-14057

SOLUBILITY
Development of multicomponent transport theory and transport data for membranes in concentrated electrolytes
[DE84-001846] N84-13249
Physical modeling of the champar .e effect
[DE84-001813] N84-13388

SOLUTES
Fourth Europhysical Conference on Lattice Defects in Ionic Crystals
[AD-A132387] N84-14039

SOLUTIONS
Pseudospectral solution of inviscid flows with multiple discontinuities
[AD-A132084] N84-13510

SOLVENTS
Investigation of the possibilities for the electrodeposition of titanium from non-aqueous solutions
[BLL-OA-TRANS-3069-(6196.3)] N84-13267
Vapor degreaser/ultrasonic cleaner solvent evaluation
[DE84-002015] N84-13331

SONAR
Surface heat flux derived from sodar amplitude and frequency data: A comparison
[DE83-017930] N84-13717

SOOT
An experimental investigation of soot behavior in a gas turbine combustor
[AD-A132210] N84-13202

SORPTION
Diffusion and sorption of cyclohexane vapor in SBS and SBR copolymers
[AD-A132397] N84-13315

SOUND TRANSMISSION
Optimum depth of propagation in shallow water
[AD-A132182] N84-13927

SOUND WAVES
An analysis of acoustic and seismic wave resonances N84-13701
Acoustic-gravity wave dispersion relations in a baroclinic atmosphere
[PB83-248690] N84-13726

SOUNDING ROCKETS
Sounding rocket XUV observations of Capella N84-14078

SOUTH DAKOTA
Analysis of the quality of image data acquired by the LANDSAT-4 Thematic Mapper (TM) of the Black Hills area, South Dakota
[E84-10041] N84-13634

SOUTHERN HEMISPHERE
Satellite observations of variations in southern hemisphere snow cover
[PB83-252908] N84-13745

SOYBEANS
Seasonal soybean crop reflectance
[E84-10049] N84-13642

SPACE CHARGE
PATH: A lumped-element beam-transport simulation program with space charge
[DE84-001330] N84-13953

SPACE COMMUNICATION
The Telecommunications and Data Acquisition Report
[NASA-CR-174610] N84-13401
The effects of Reed-Solomon code shortening on the performance of coded telemetry systems N84-13403

SPACE COOLING (BUILDINGS)
Hybrid space heating/cooling system with Trombe wall, underground venting, and assisted heat pump
[DE84-000406] N84-13686

SPACE ENVIRONMENT SIMULATION
The Marshall Space Flight Center Low-Energy Ion Facility: A preliminary report
[NASA-TM-82559] N84-13933

SPACE FLIGHT
Research and technology, 1983
[NASA-TM-83540] N84-14061

SPACE HEATING (BUILDINGS)
Hybrid space heating/cooling system with Trombe wall, underground venting, and assisted heat pump
[DE84-000406] N84-13686

SPACE PLATFORMS
Lightning mapping sensor study
[NASA-CR-170908] N84-13731

SPACE POWER REACTORS
Space reactor system and subsystem investigations: Assessment of technology issues for the reactor and shield subsystem, SP-100 Program
[DE84-001566] N84-13979
Space-reactor system and subsystem investigations: Cost and schedule estimates for reactor and shield subsystems technology development. SP-100 program
[DE84-000112] N84-13984

SPACE PROCESSING
Potential means of support for materials processing in space. A history of government support for new technology
[NASA-TM-82554] N84-13205
Microgravity silicon zoning investigation
[NASA-CR-170919] N84-13207

SPACE PROGRAMS
Operational applications of military test ranges in space transportation system programs
[AD-A132535] N84-13217

SPACE SHUTTLE ORBITERS
Evaluation of non-intrusive flow measurement techniques for a re-entry flight experiment
[NASA-CR-172142] N84-13212

SPACE SHUTTLE PAYLOADS
Baffle system employing reflective surfaces
[NASA-TM-84406] N84-13985

SPACE TRANSPORTATION SYSTEM
Operational applications of military test ranges in space transportation system programs
[AD-A132535] N84-13217

SPACEBORNE EXPERIMENTS
Microgravity silicon zoning investigation
[NASA-CR-170919] N84-13207

SPACECRAFT COMMUNICATION
The 30 GHz communications satellite low noise receiver
[NASA-CR-168254] N84-13398

SPACECRAFT DESIGN
Research and technology, 1983
[NASA-TM-83540] N84-14061

SPACECRAFT LAUNCHING
Shot to the moon from a cannon
[AD-A132554] N84-13216

SPACECRAFT MANEUVERS
Solution of the 2-point boundary value problems of optimal spacecraft rotational maneuvers N84-13870

SPACECRAFT MOTION
Solution of the 2-point boundary value problems of optimal spacecraft rotational maneuvers N84-13870

SPACECRAFT RECOVERY
A new operation method for a large-scale shock tunnel
[NAL-TR-765] N84-13200

SPACECRAFT STRUCTURES
Microwave monolithic integrated circuit development for future spaceborne phased array antennas
[NASA-TM-83518] N84-13399

SPACING
Determining stresses in the presence of nonlinearities in interplanar spacing versus Sin squared Psi
[AD-A132365] N84-14041

SPALLATION
ASPUN, Argonne super intense pulsed pallation neutron source
[DE84-000311] N84-13941

SPARE PARTS
Integrated logistic supportability (Aviation materiel)
[AD-A132367] N84-13146

SPARK CHAMBERS
Problems and prospects in strange baryon spectroscopy
[DE83-018119] N84-13253

SPATIAL FILTERING
Spatial filtering for enhancing point targets in images from a space-based mosaic IR detector
[AD-A132249] N84-13425

SPATIAL RESOLUTION
The United Kingdom SATMaP program
[E84-10002] N84-13627
Information content of data from the LANDSAT 4 Thematic Mapper (TM) and multispectral scanner (MSS)
[E84-10034] N84-13628
The use of linear feature detection to investigate thematic mapper data performance and processing
[E84-10037] N84-13630
The use of thematic mapper data for land cover discrimination: Preliminary results from the UK SATMaP programme
[E84-10038] N84-13631
SPECIFICATIONS
Proceedings of the Third LAN-Transport Workshop. Report of the Third Workshop for Local Area Network Implementors of the NBS Specifications of the International Standards Organization Transport Class 4 Protocol Special Interest Group on File Transfer Protocol
[PB83-251348] N84-13857
SPECTRAL BANDS
The United Kingdom SATMaP program
[E84-10002] N84-13627
Application of remote sensing to hydrological problems and floods
[E84-10046] N84-13639
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E84-10050] N84-13643
SPECTRAL EMISSION
Vibrational spectroscopy of chemisorbed molecules by infrared emission
[DE84-000956] N84-13973
SPECTRAL ENERGY DISTRIBUTION
On a relation between Maximum-Likelihood classification and Minimum-Cross-Entropy classification
[AD-A132237] N84-13426
SPECTRAL REFLECTANCE
Seasonal soybean crop reflectance
[E84-10048] N84-13642
SPECTRAL RESOLUTION
Information content of data from the LANDSAT 4 Thematic Mapper (TM) and multispectral scanner (MSS)
[E84-10034] N84-13628
The use of thematic mapper data for land cover discrimination: Preliminary results from the UK SATMaP programme
[E84-10038] N84-13631
Analysis of multispectral scanner (MSS) and Thematic Mapper (TM) performance (pre-launch and post-launch)
[E84-10043] N84-13636
SPECTRORADIOMETERS
Spectroradiometric calibration of the thematic mapper and multispectral scanner system
[E84-10045] N84-13638
SPECTROSCOPIC ANALYSIS
Fast, self-nulling spectroscopic ellipsometer: Instrumentation and application, revision
[DE83-015531] N84-13994
SPECTRUM ANALYSIS
Algorithms for single-signal and multisignal minimum-cross-entropy spectrum analysis
[AD-A132400] N84-13420
Adaptive spectral smoothing
[AD-A132574] N84-13887
Multisignal Minimum-Cross-Entropy spectrum analysis weighted priors
[AD-A132358] N84-13896
SPEECH
Stress assessment through voice analysis
[AD-A132577] N84-13773
SPHERES
Approximate solution of the problem of thermoelasticity of a sphere with variable properties
[BLL-M-35369-(5828.4F)] N84-13606
Interaction of a stream of dielectric spheres in an electric field in a high vacuum
[DE83-013695] N84-13958
Self-consistent spherical accretion and models of quasars N84-14088
SPHERICAL COORDINATES
Solution of Poisson equations for 3-dimensional grid generations --- computations of a flow field over a thin delta wing
[NASA-TM-85857] N84-13886
SPIN DYNAMICS
Theoretical studies of oxygen-iodine laser mechanisms and new laser concepts
[AD-A132374] N84-13550
SPIN GLASS
Relaxation in spin glasses: Similarities and differences from ordinary glasses
[DE84-001719] N84-13330
SPIN-ORBIT INTERACTIONS
Host-lattice effects in the spin-orbit fine structure of vacancy-trapped electrons
[DE84-000599] N84-14052
SPINACH
Kinetic and spectroscopic studies of cytochrome b-563 in isolated cytochrome b/f complex and in thylakoid membranes
[DE83-017982] N84-13760
SPLINE FUNCTIONS
Splines and the Galerkin method for solving the integral equations of scattering theory
[CSIR-TWISK-267] N84-13873
Multivariate, minimum-curvature splines for randomly spaced data
[AD-A132319] N84-13899
SPONTANEOUS COMBUSTION
Present state of research in Japan on toxicities of gases during fire N84-13349
SPOOLS
Electrical and magnetic properties of the energy-saver correction elements
[DE83-017327] N84-13983
SPORADIC E LAYER
Observations and theory of irregularities of middle latitude sporadic E layers N84-13703
SPRAY CHARACTERISTICS
A theoretical and experimental study of turbulent particle-laden jets
[NASA-CR-166293] N84-13187
SPRAY NOZZLES
A theoretical and experimental study of turbulent particle-laden jets
[NASA-CR-166293] N84-13187
SPREAD SPECTRUM TRANSMISSION
White light signal processing with the application to spread spectrum communications
[AD-A132418] N84-13417
SPRINKLING
Sprinklers N84-13345
Automatic sprinklers N84-13346
SQUALLS
A composite analysis of a tropical squall-line system N84-13727
STABILITY
Solubility of the NiO fuel-cell cathode in Li2CO3 melts as determined by cyclic voltammetry
[DE83-014311] N84-13485
Electron-cyclotron maser and whistler instabilities in a relativistic electron plasma with loss-cone distribution
[DE84-001607] N84-13561
Two-dimensional accretion disk structure and stability N84-14090
Baroclinic waves in the atmosphere of Mars: Observations, linear instability, and finite-amplitude evolution N84-14094
STABILIZATION
A frequency stabilization and trigger control unit for hybrid TEA-CO2 lasers
[AD-A132247] N84-13552
STABILIZERS (FLUID DYNAMICS)
Helicopter vertical stabilizer design considerations
[AD-A132308] N84-13180
STACKS
Moltencarbonate fuel cells, development status
[DE84-000612] N84-13480
Develop and test fuel cell powered on-site integrated total energy system
[NASA-CR-168239] N84-13673
STAINLESS STEELS
Effect of phosphorus on the swelling and precipitation behavior of austenitic stainless steels during irradiation
[DE84-000412] N84-13275
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 3. A model for the effect of titanium addition
[DE84-001296] N84-13281
Grain boundary segregation and environmental degradation of a ferritic stainless steel
[DE83-016927] N84-13289
Modeling crack-growth processes in fusion-reactor materials
[DE84-000477] N84-13291
Influence of a flowing-lithium environment on the fatigue and tensile properties of type 316 stainless steel
[DE84-000611] N84-13295
STAIRWAYS
Effective-width model for evacuation flow N84-13362
STANDARD DEVIATION
A vertical wind angle standard deviation calculation method for the unstable surface boundary layer
[AD-A132362] N84-13739
STANDARDIZATION
Spectrographic investigation of gold by Grimm lamp
[CSIR-SR-283] N84-13233
Study of potential standardization of video teleconferencing systems. Volume 2: Appendices
[AD-A132081] N84-13431
Study of potential standardization of video teleconferencing systems, volume 1
[AD-A132080] N84-13432
Standard format for data films --- synchrotron radiation sources
[DE84-000345] N84-14068
STANDARDS
Aluminum as a global high-pressure equation-of-state standard
[DE84-000153] N84-13287
Standard NIM digital bus (NIM/GPIE)
[DE83-017865] N84-13435
A guide for effluent radiological measurements at DOE installations
[DE83-016639] N84-13542
Short introduction to office applications of markup language
[DE83-011400] N84-13844
Proceedings of the Third LAN-Transport Workshop. Report of the Third Workshop for Local Area Network Implementors of the NBS Specifications of the International Standards Organization Transport Class 4 Protocol Special Interest Group on File Transfer Protocol
[PB83-251348] N84-13857
STARTERS
Baseline and verification tests of the electric vehicle associates' current fare station wagon
[AD-A132549] N84-14072
STATIC ELECTRICITY
The 1980 International Aerospace Conference on Lightning and Static Electricity
[CSIR-ELEK-249] N84-13733
STATIC PRESSURE
NASTRAN structural model for the large 64-meter antenna pedestal. Part 2: Improved model N84-13412
STATISTICAL ANALYSIS
Comparison of low-altitude wind-shear statistics derived from measured and proposed standard wind profiles
[NASA-TM-85668] N84-13172
Simulation and analysis of low altitude terrestrial satellites
[INPE-2754-PRE/330] N84-13209
Statistical analysis of Kevlar 49/epoxy composite stress-rupture data
[DE84-000516] N84-13230
Analysis of lead-acid battery accelerated testing data
[DE83-017403] N84-13473
Forest statistics for southwest-north Alabama counties
[PB83-251314] N84-13662
Forest statistics for southwest-south Alabama counties, Forest Service resource bulletin
[PB83-249763] N84-13664
Forest statistics for southeast Alabama counties, Forest Service resource bulletin
[PB83-250753] N84-13666
Forest area and timber resource statistcs for state and private lands in New Mexico, 1980, Forest Service resource bulletin
[PB83-251157] N84-13667
Forest statistics for west central Alabama counties, Forest Service resource bulletin
[PB83-249961] N84-13668
Range reference atmosphere 0-70 km altitude
[AD-A132487] N84-13737
White Sands Missile Range, New Mexico Range reference atmosphere 0-70 km altitude
[AD-A132471] N84-13738
Life histories and monitoring strategies: Some lessons from field experience
[DE83-016164] N84-13763
Adaptive spectral smoothing
[AD-A132574] N84-13887
STATISTICAL CORRELATION
Time series long memory identification and quantile spectral analysis
[AD-A132240] N84-13900
STATISTICAL DISTRIBUTIONS
Comparison of low-altitude wind-shear statistics derived from measured and proposed standard wind profiles
[NASA-TM-85668] N84-13172
Asymptotic null and nonnull distributions of three multivariate test statistics in Gmanova
[TR-82] N84-13905
STATISTICAL MECHANICS
Revision of the statistical mechanics of phonons to include phonon line widths
[DE83-017229] N84-14051
STATISTICAL TESTS
Algorithm for computing significance levels using the Kolmogorov-Smirnov statistic and valid for both large and small samples
[DE84-001586] N84-13909

STEADY FLOW
La Recherche Aerospatiale, Biomonthly Bulletin, no. 1982-4, 209/July-August 1982
[ESA-TT-781] N84-13141
STEADY STATE
Multiple steady states of buoyancy induced flow in cold water and their stability N84-13487
Oak Ridge heat-pump models. Part 1. A steady-state computer design model for air-to-air heat pumps
[DE84-001577] N84-13519
STEAM
Condensation heat transfer of steam on a single horizontal tube
[AD-A132245] N84-13508
The effect of condensate inundation on steam condensation heat transfer to wire-wrapped tubing
[AD-A132175] N84-14060
STEELS
Formation of structure of low-alloy steel inoculated with rare-earth metals and alkaline-earth metals
[BLL-M-35321] N84-13258
The electrodeposition of titanium coatings
[BLL-OA-TRANS-3057-(6196.3)] N84-13260
Galvanic coupling between D6AC steel, 6061-T6 aluminum, Inconel 718 and graphite-epoxy composite material: Corrosion occurrence and prevention
[NASA-TP-2236] N84-13263
Thermomechanical processing of M-50 steel
[AD-A132272] N84-13271
Fluidized-bed and salt-bath heat treating (AISI 4130 and 4340 alloy steels)
[DE84-000979] N84-13290
Measurement of friction and wear on modified surfaces
[AD-A132364] N84-13583
STELLAR ATMOSPHERES
An abundance analysis of the cool barium stars N84-14087
STELLAR EVOLUTION
Large scale galactic shocks and motions of the cloud medium N84-14089
STELLAR FLARES
Physics of the synchrotron model of cosmic gamma-ray bursts
[DE84-000917] N84-14104
STELLAR LUMINOSITY
A study of the empirical mass-luminosity diagram for early type stars N84-14075
The effect of opacity on theoretical models of RR Lyrae stars N84-14081
STELLAR MAGNETIC FIELDS
Self-consistent magnetosphere for a static aligned rotator N84-14085
STELLAR MASS
A study of the empirical mass-luminosity diagram for early type stars N84-14075
STELLAR MODELS
The effect of opacity on theoretical models of RR Lyrae stars N84-14081
STELLAR SPECTRA
A study of the empirical mass-luminosity diagram for early type stars N84-14075
Ionization equilibrium in isolated H 2 regions N84-14086
STELLAR STRUCTURE
Do pions condense in neutron-star matter?
[DE84-000463] N84-14093
STIFFNESS
Stability, vibration and passive damping of partially restrained imperfect columns
[NASA-TM-85697] N84-13608
STIMULATED EMISSION DEVICES
The Nova laser assurance-management system
[DE83-018188] N84-13568
STIRLING CYCLE
Stirling-engine heat-actuated heat pump
[DE83-017137] N84-13529
Parametric testing and evaluation of a free-piston Stirling engine/linear-compressor system
[DE83-017282] N84-13590
Stirling engine patents: International patent inventory
[DE84-002378] N84-13592
STOCHASTIC PROCESSES
The amplitude density function and high-resolution frequency analysis of time series
[AD-A132466] N84-13906
STORAGE RINGS (PARTICLE ACCELERATORS)
Low-noise gallium-arsenide field-effect transistor preamplifiers for stochastic beam-cooling systems
[DE83-017535] N84-13475
PR beam-pulse formation and control
[DE84-001354] N84-13936
The e+e- collisions in the multi-TeV region
[DE84-000993] N84-13968
Magnetic field measurements of superconducting magnets for the colliding beam accelerator
[DE83-017351] N84-13982
Colliding-beam-accelerator lattice
[DE83-017875] N84-14050
STORAGE STABILITY
Storage of synthetic turbine lubricants under adverse conditions
[AD-A132226] N84-13319
Middle distillate fuel stability characteristics: A review
[AD-A132156] N84-13337
STORAGE TANKS
Earthquake response considerations of broad liquid storage tanks
[PB83-251215] N84-13393
STRAIN GAGES
Aerodynamic force measurements with a train-gage balance in a cryogenic wind tunnel
[NASA-TP-2251] N84-13162
Instruction manual for the use of the CSIR triaxial rock stress measuring equipment
[CSIR-ME-1763] N84-13535
STRAIN RATE
Strain analysis of thin composites with Moire method
[NAL-TR-754] N84-13612
STRANGENESS
Multiquark exotics
[DE83-017958] N84-13964
Theoretical perspectives on strange physics
[DE83-018085] N84-13965
STRATEGIC MATERIALS
Replacing critical and strategic refractory metal elements in nickel-base superalloys --- NASA's COSAM program
[NASA-TM-83528] N84-13264
STRATEGY
Decision making and information processing under various uncertainty conditions
[AD-A132051] N84-13770
STRATIGRAPHY
Kriging of geological and physical parameters from Yucca Flat, NTS
[DE83-018227] N84-13625
Geologic survey in the south-central region of Mato Grosso
[E84-10039] N84-13632
Geology of carbonate aggregate resources of Illinois, Illinois mineral notes
[PB83-251140] N84-13725
STREAMS
Assessment of quality of data on tapes from the hydrogeochemical and stream sediment reconnaissance
[DE83-017697] N84-13647
STRESS (PHYSIOLOGY)
Women at work and stress
[R/PERS-626] N84-13777
STRESS (PSYCHOLOGY)
Women at work and stress
[R/PERS-626] N84-13777
STRESS ANALYSIS
The mechanics of delamination in fiber-reinforced composite materials. Part 1: Stress singularities and solution structure
[NASA-CR-172269] N84-13221
Computational models for cyclic plasticity, rate dependence and creep in finite element analysis
[PB83-245829] N84-13308
Strain analysis of thin composites with Moire method
[NAL-TR-754] N84-13612
Structural analysis of a glass/space frame parabolic-trough solar collector for various operating positions
[DE84-001137] N84-13622
Inelastic analysis of piping and tubular structures
[PB83-249987] N84-13623
The plane stress/strain analysis of non-homogeneous continua by the boundary integral equation method
[TR-821S] N84-13880
NOSTRUM: A finite element program for nonlinear structural mechanics
[TR-18] N84-13881
STRESS CONCENTRATION
Biaxial fatigue, a review of the literature
[FRP-82/17] N84-13266
STRESS CORROSION
Fiber composite materials research in the UK: Assessment report
[AD-A132386] N84-13226
Grain boundary segregation and environmental degradation of a ferritic stainless steel
[DE83-016927] N84-13289
Glass fibre/epoxy resin interface life-time prediction
[AD-A132206] N84-13320
STRESS CORROSION CRACKING
Evaluation of stress corrosion cracking characteristics of selected fastener systems in 7075-T6 aluminum
[AD-A132162] N84-13272
STRESS INTENSITY FACTORS
The propagation and arrest of an edge crack in an elastic half-space under conditions of anti-plane shear: Analytical and numerical results N84-13604
STRESS MEASUREMENT
Instruction manual for the use of the CSIR triaxial rock stress measuring equipment
[CSIR-ME-1763] N84-13535
STRESS RELAXATION
Stress-wave experiments on selected crustal rocks and minerals
[DE84-001613] N84-13714
STRESS-STRAIN RELATIONSHIPS
Generalized plastic hinge concepts for 3D beam-column elements
[PB83-247981] N84-13391
Probabilistic fatigue life predictions of structural components in high-cycle fatigue regimes
[AD-A132425] N84-13615
The emergence and propagation of a phase boundary in an elastic bar
[AD-A132275] N84-13616
Determining stresses in the presence of nonlinearities in interplanar spacing versus Sin squared Psi
[AD-A132365] N84-14041
STRESSES
Statistical analysis of Kevlar 49/epoxy composite stress-rupture data
[DE84-000516] N84-13230
Absolute determination of stress in textured materials
[DE83-018063] N84-13621
Stress assessment through voice analysis
[AD-A132577] N84-13773
Determining stresses in the presence of nonlinearities in interplanar spacing versus Sin squared Psi
[AD-A132365] N84-14041
STRUCTURAL ANALYSIS
NASTRAN structural model for the large 64-meter antenna pedestal. Part 2: Improved model N84-13412
NOSTRUM: A finite element program for nonlinear structural mechanics
[TR-18] N84-13881
STRUCTURAL DESIGN
Optimization of structures subjected to periodic loads N84-13605
MOD-2 wind turbine development
[NASA-TM-83460] N84-13670
STRUCTURAL DESIGN CRITERIA
Building systems and smoke control N84-13347
Outline of methods for design of superconducting turbogenerators
[AD-A132528] N84-13451
Analytical studies of advanced high-field designs: 20-Tesla large-bore superconducting magnets
[DE83-017591] N84-13918
Space-reactor system and subsystem investigations: Cost and schedule estimates for reactor and shield subsystems technology development. SP-100 program
[DE84-000112] N84-13984
Low-activation fusion-reactor design studies
[DE83-017688] N84-14014
STRUCTURAL MEMBERS
Probabilistic fatigue life predictions of structural components in high-cycle fatigue regimes
[AD-A132425] N84-13615
STRUCTURAL PROPERTIES (GEOLOGY)
Geologic survey in the south-central region of Mato Grosso
[E84-10039] N84-13632
Correlation of LANDSAT and air photo linears with roof control problems and geologic features
[PB83-250852] N84-13656
Interpretation of aeromagnetic anomalies of the Quadrilatero Ferrifero region
[INPE-2897-PRE/416] N84-13707
Geology of faults exposed in trenches in Crater Flat, Nye County, Nevada
[DE84-000181] N84-13716
STRUCTURAL STABILITY
Large laser system facility design
[DE84-000159] N84-13553
Analysis and control of quasi distributed parameter systems N84-13603
Stability, vibration and passive damping of partially restrained imperfect columns
[NASA-TM-85697] N84-13608
STRUCTURAL VIBRATION
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-5, 210/September-October 1982
[ESA-TT-785] N84-13142
Work done to determine the source of errors on conditioned pressure transduce signals in the JT9D-7F turbofan engines used on SAA Boeing 747 aircraft
[NIAST-82/78] N84-13192
Analysis and control of quasi distributed parameter systems N84-13603

An improved finite-difference analysis of uncoupled vibrations of tapered cantilever beams
[NASA-TM-83495] N84-13610
SUBMERGED BODIES
User's manual for CABLE: A three-dimensional, finite-segment computer code for submerged and partially submerged cable systems
[AD-A132515] N84-13821
SUBROUTINES
Development of a GIFTS (graphics-oriented interactive finite-element time-sharing system) plotting package compatible with either PLOT10 or IBM/DSM graphics
[AD-A132195] N84-13833
Portable FORTRAN contour-plotting subprogram
[DE83-017422] N84-13846
SUBSTITUTES
Replacing critical and strategic refractory metal elements in nickel-base superalloys --- NASA's COSAM program
[NASA-TM-83528] N84-13264
SUBSTRATES
MM and T: Ceramic metal substrates for hybrid electronics
[AD-A132514] N84-13313
Cell-substrate bonding system design and development
[DE84-000963] N84-13678
Chemical conversion surfaces for solar-energy applications
[DE84-000107] N84-13681
SUCTION
Investigation of the generation of regular waves by a sliding valve pneumatic wave generator
[CSIF-RR-553] N84-13579
SULFUR
Performance specifications for continuous monitoring of total reduced sulfur emissions (proposed July 20, 1981, 46 FR 37287), summary of comments and responses
[PB83-251009] N84-13696
SULFUR DIOXIDES
Characterization of reactants, reaction mechanisms and reaction products leading to extreme acid rain and acid aerosol conditions in southern California
[PB83-252825] N84-13697
SUMS
Twisted sums of nuclear Frechet spaces N84-13800
SUNLIGHT
An analysis of cloud cover at Johannesburg, Cape Town and Durban, in South Africa
[CSIR-NBRI-SR-BOU-60] N84-13734
SUNSPOTS
The amplitude density function and high-resolution frequency analysis of time series
[AD-A132466] N84-13906
SUPERCOMPUTERS
Scheduling supercomputers
[AD-A132512] N84-13822
SUPERCONDUCTING MAGNETS
Control and operation cost optimization of the HISS cryogenic system
[DE83-017741] N84-13384
Cryogenic testing of the TPC superconducting solenoid
[DE84-000528] N84-13467
Void-free epoxy castings for cryogenic insulators and seals
[DE83-017273] N84-13479
Ideal of the perfect magnet-superconducting systems
[DE83-015080] N84-13482
Analytical studies of advanced high-field designs: 20-Tesla large-bore superconducting magnets
[DE83-017591] N84-13918
Magnetic field measurements of superconducting magnets for the colliding beam accelerator
[DE83-017351] N84-13982
Electrical and magnetic properties of the energy-saver correction elements
[DE83-017327] N84-13983
Forced two-phase cooling of the TPC superconducting solenoid
[DE83-017749] N84-14049
Colliding-beam-accelerator lattice
[DE83-017875] N84-14050
SUPERCONDUCTIVITY
The relationship between the martensitic phase transition and the superconducting properties of A15 compounds
[DE83-018186] N84-13477
Is it superconductivity at 293 k?
[AD-A132545] N84-14037
Far infrared studies on superconductors and heat-capacity studies on liquid crystals
[DE84-001105] N84-14046
Surface properties of metal-nitride and metal-carbide films deposited on Nb for RF superconductivity
[DE84-001491] N84-14055
SUPERCONDUCTORS
Superconducting niobium thin film slow-wave structures N84-13405
Outline of methods for design of superconducting turbogenerators
[AD-A132528] N84-13451
Neutron-scattering studies of magnetic superconductors
[DE84-000393] N84-14054
SUPERCOOLING
Heat transfer to subcooled HE 1
[DE83-017767] N84-13520
SUPERCRITICAL WINGS
Analysis of pressure distributions on a wing with an oscillating trailing edge flap in subsonic and transonic flow N84-13145
SUPERHIGH FREQUENCIES
Pulsed-power diode generation of high-power microwaves
[DE84-001344] N84-13440
SUPERNOVAE
The Crab Nebula: A theoretical and observational study N84-14074
SUPERSONIC COMBUSTION
A study of air breathing rockets. 3: Supersonic mode combustors
[NAL-TR-756] N84-13213
SUPERSONIC COMBUSTION RAMJET ENGINES
Preliminary scramjet design for hypersonic airbreathing missile application
[NASA-CR-3742] N84-13195
Enhancement of the CAVE computer code --- aerodynamic heating package for nose cones and scramjet engine sidewalls
[NASA-CR-3731] N84-13501
SUPERSONIC CRUISE AIRCRAFT RESEARCH
Investigation of installation effects on twin-engine convergent-divergent nozzles
[NASA-TP-2205] N84-13152
SUPERSONIC FLIGHT
Flight test and analyses of the B-1 structural mode control system at supersonic flight conditions
[NASA-CR-170405] N84-13197
SUPERSONIC FLOW
An analytical method to calculate the flow field about blunt bodies of revolution at incidence in supersonic free stream flow
[CSIR-NIAST-82/72] N84-13156
SUPERSONIC INLETS
Three-dimensional viscous design methodology for advanced technology aircraft supersonic inlet systems
[NASA-TM-83558] N84-13190
SURFACE FINISHING
Oxidation of Inconel alloy MA754 at low oxidation potential
[DE83-017191] N84-13288
SURFACE GEOMETRY
Determining stresses in the presence of nonlinearities in interplanar spacing versus Sin squared Psi
[AD-A132365] N84-14041
SURFACE LAYERS
A vertical wind angle standard deviation calculation method for the unstable surface boundary layer
[AD-A132362] N84-13739
SURFACE PROPERTIES
Application of surface-physics techniques to the study of electrochemical systems
[DE84-000957] N84-13245
Reduction of tritium permeation through iron using aluminum-ion implantation
[DE84-000184] N84-13279
Radiation-induced phosphorus segregation in austenitic and ferritic alloys
[DE84-000903] N84-13302
Slippery versus slip resistant work surfaces: The background for a regulatory definition
[PB83-243634] N84-13392
Evaluation of selective solar-absorber surfaces, phase 2
[DE84-000067] N84-13685
Surface heat flux derived from sodar amplitude and frequency data: A comparison
[DE83-017930] N84-13717
A survey of underwater-acoustic ray tracing techniques
[PB83-250522] N84-13931
SURFACE REACTIONS
Application of surface-physics techniques to the study of electrochemical systems
[DE84-000957] N84-13245
SURFACE ROUGHNESS
A variational method for estimating the general circulation in the ocean N84-13626
SURFACE TEMPERATURE
Analytical investigation of meso-scale boundary layer forced by surface temperature variation in a stratified sheared atmosphere N84-13702
SURFACE TO AIR MISSILES
Preliminary scramjet design for hypersonic airbreathing missile application
[NASA-CR-3742] N84-13195
SURFACE WAVES
An analysis of acoustic and seismic wave resonances N84-13701
SURGES
The transient response of circular foil heat-flux gages
[DE83-017785] N84-13541
SWELLING
Comparison of compression properties and swelling of beryllium irradiated at various temperatures
[DE84-000597] N84-13277
SWITCHES
Theoretical modeling of the plasma-erosion opening switch for inductive-storage applications
[DE84-001843] N84-13483
Temperature rise of handles and knobs
[BLL-OA-TRANS-3047-(6196.3)] N84-13502
Electron-drift velocity and ionization and attachment coefficients in gases/mixtures for diffuse-discharge opening switches
[DE83-017206] N84-14017
SWITCHING CIRCUITS
An FET full-bridge switcher for inductorless capacitor charging for Nova
[DE83-018005] N84-13471
A programmable controller with overcurrent latch for constant primary peak current in capacitor-charging FET switcher for Nova
[DE83-018184] N84-13569
SYMBOLS
Cognitive components underlying the digit symbol test
[PB83-250464] N84-13779
Short introduction to office applications of markup language
[DE83-011400] N84-13844
SYNAPSES
The effects of hyperbaric elemental gases on the rate coefficient of K(+) influx in mammalian synaptosomes N84-13754
SYNCHRONISM
Impossibility of distributed consensus with one faulty process
[AD-A132503] N84-13823
SYNCHRONOUS SATELLITES
Rain estimation from satellites: An examination of the Griffith-Woodley technique
[NASA-TM-84969] N84-13735
Economic benefits of operational environmental satellites
[PB83-252932] N84-13748
SYNCHROTRON RADIATION
Channel electron multiplier and optically coupled amplifier used as an incident-flux monitor
[DE84-001451] N84-13539
Standard format for data films --- synchrotron radiation sources
[DE84-000345] N84-14068
Physics of the synchrotron model of cosmic gamma-ray bursts
[DE84-000917] N84-14104
Inverse comptonization vs. thermal synchrotron
[DE84-001039] N84-14105
SYNCHROTRONS
High-Q perpendicular-biased ferrite-tuned cavity
[DE83-017291] N84-13478
ASPUN, Argonne super intense pulsed pallation neutron source
[DE84-000311] N84-13941
ARCHSIM: A proton-synchrotron tracking program, including longitudinal space charge
[DE84-001335] N84-13952
SYNTHESIS (CHEMISTRY)
The role of the tetrapropylammonium template in the synthesis of zeolite ZSM-5
[CSIR-CENG-413] N84-13236
Nuclear-medicine
[DE84-000346] N84-13759
SYNTHETIC APERTURE RADAR
Reflection and identification studies applied to terrain imaging radar
[AD-A132401] N84-13419
SYSTEM EFFECTIVENESS
Integrated logistic supportability (Aviation materiel)
[AD-A132367] N84-13146
Optical methods of measuring loudspeaker diaphragm movement
[BBC-RD-1983/13] N84-13396

SYSTEMS ANALYSIS
Algorithms for automated diagnosis of faults in physical plant
[DE84-000192] N84-13841
Benchmarking the join operations of relational database machines
[AD-A132312] N84-13861
SYSTEMS ENGINEERING
Design issues in the GCF Mark 4 development N84-13415
Issues in the design and implementation of Act2
[AD-A132326] N84-13826
Tools for the creation of IMS database designs from Entity-Relationship diagrams
[DE84-000592] N84-14066

T

TABLES (DATA)
Forest statistics for southwest-south Alabama counties, Forest Service resource bulletin
[PB83-249763] N84-13664
TAPERED COLUMNS
An improved finite-difference analysis of uncoupled vibrations of tapered cantilever beams
[NASA-TM-83495] N84-13610
TARGET RECOGNITION
Spatial filtering for enhancing point targets in images from a space-based mosaic IR detector
[AD-A132248] N84-13425
Advanced pattern recognition
[AD-A132339] N84-13987
TARGET THICKNESS
A study of thick-target X-ray spectra using photonuclear reactions
[AD-A132543] N84-13934
TAYLOR INSTABILITY
Complex eigenvalues for the stability of Couette flow
[NASA-CR-172251] N84-13492
TEA LASERS
A frequency stabilization and trigger control unit for hybrid TEA-CO2 lasers
[AD-A132247] N84-13552
TEARING MODE (PLASMAS)
Nonlinear kinetic theory of a single helicity tearing instability
[DE84-000049] N84-14024
TECHNOLOGICAL FORECASTING
Energy-efficient automobiles for the future
[DE84-000600] N84-14073
TECHNOLOGY ASSESSMENT
Current state of titanium coating methods
[BLL-OA-TRANS-3067-(6196.3)] N84-13268
Sprinklers N84-13345
A proposed RF-technology R/D plan for the United States
[DE84-000643] N84-13434
Assessment of the adequacy of US accelerator technology for Department of Energy Missions
[DE84-001632] N84-13945
Space reactor system and subsystem investigations: Assessment of technology issues for the reactor and shield subsystem, SP-100 Program
[DE84-001566] N84-13979
d-d Tokamak reactor assessment
[DE83-016127] N84-14019
Technology assessment: 1983 forecast of future test technology requirements
[AD-A132421] N84-14107
TECHNOLOGY TRANSFER
A proposed RF-technology R/D plan for the United States
[DE84-000643] N84-13434
TECHNOLOGY UTILIZATION
Developing computer-graphics programs for specialized applications
[DE83-016181] N84-13836
TECTONICS
Geology of faults exposed in trenches in Crater Flat, Nye County, Nevada
[DE84-000181] N84-13716
TELECOMMUNICATION
The Telecommunications and Data Acquisition Report
[NASA-CR-174610] N84-13401
The effects of Reed-Solomon code shortening on the performance of coded telemetry systems N84-13403
TELECONFERENCING
Study of potential standardization of video teleconferencing systems. Volume 2: Appendices
[AD-A132081] N84-13431
Study of potential standardization of video teleconferencing systems, volume 1
[AD-A132080] N84-13432
The development and application of an advanced computer-based shared-graphic workstation for video teleconferencing
[AD-A132583] N84-13817
TELEMETRY
The effects of Reed-Solomon code shortening on the performance of coded telemetry systems N84-13403
Nevada test site seismic-telemetry measurements
[DE84-000447] N84-13719
TELEOPERATORS
Analysis of large space structures assembly: Man/machine assembly analysis
[NASA-CR-3751] N84-13208
Kinematic equations for resolved-rate control of an industrial robot arm
[NASA-TM-85685] N84-13866
TELEVISION SYSTEMS
Study of potential standardization of video teleconferencing systems. Volume 2: Appendices
[AD-A132081] N84-13431
Study of potential standardization of video teleconferencing systems, volume 1
[AD-A132080] N84-13432
TEMPERATURE CONTROL
Coordinate-measuring machine capability
[DE84-002014] N84-13544
TEMPERATURE DEPENDENCE
Approximate solution of the problem of thermoelasticity of a sphere with variable properties
[BLL-M-35369-(5828.4F)] N84-13606
Matrix approach to testing mirrors, part 2
[DE83-011996] N84-13676
TEMPERATURE DISTRIBUTION
Component temperature versus laser-welding parameters
[DE84-000362] N84-13559
TEMPERATURE EFFECTS
Storage of synthetic turbine lubricants under adverse conditions
[AD-A132226] N84-13319
Mechanisms of elevated-temperature rupture in single-phase ceramics
[DE83-017779] N84-13327
Analysis of lead-acid battery accelerated testing data
[DE83-017403] N84-13473
New relationships for turbulent plumes
[NAL-TR-763] N84-13495
The organic geochemistry of deep ground waters and radionuclide-partitioning experiment: Under hydrothermal conditions
[DE83-015784] N84-13651
TEMPERATURE GRADIENTS
Characterization of the general purpose research furnace for low-G directional solidification experiments
[NASA-TM-85718] N84-13211
TEMPERATURE MEASUREMENT
Stratified maximum temperature relationships between sixteen zone stations in Arizona and respective key stations
[PB83-249904] N84-13746
Fiber optics temperature and pressure probe
[DE84-001785] N84-13990
A practical sublimation source for large-scale chromium gettering in fusion devices
[DE84-000724] N84-14002
TEMPLATES
The role of the tetrapropylammonium template in the synthesis of zeolite ZSM-5
[CSIR-CENG-413] N84-13236
TENSILE PROPERTIES
Tensile and low-cycle fatigue measurements on cross-rolled tungsten at 1505 K
[DE84-000805] N84-13273
A comparison of the irradiated tensile properties of a high-manganese austenitic steel and type 316 stainless steel
[DE84-000260] N84-13294
Influence of a flowing-lithium environment on the fatigue and tensile properties of type 316 stainless steel
[DE84-000611] N84-13295
TENSILE STRENGTH
Tensile strength of pressureless-sintered silicon nitride at elevated temperature
[NAL-TR-753] N84-13611
TENSILE STRESS
Biaxial fatigue, a review of the literature
[FRP-82/17] N84-13266
TERRAIN
Reflection and identification studies applied to terrain imaging radar
[AD-A132401] N84-13419
SRL tethersonde and echosonde data, Anderson Creek Valley, California
[DE84-001680] N84-13715
TEST EQUIPMENT
Technology assessment: 1983 forecast of future test technology requirements
[AD-A132421] N84-14107
TEST FACILITIES
An experimental investigation of soot behavior in a gas turbine combustor
[AD-A132210] N84-13202
A proposed RF-technology R/D plan for the United States
[DE84-000643] N84-13434
THEMATIC MAPPING
The United Kingdom SATMaP program
[E84-10002] N84-13627
Application of remote sensing to hydrological problems and floods
[E84-10046] N84-13639
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E84-10050] N84-13643
THEOREMS
The specific solutions of a uniform algebraic differential equation of the second order
[ISSN-0066-1953] N84-13783
On some extensions of a theorem of Hardy and Littlewood N84-13784
Use of an exact penalty function for optimization of discrete problems
[INPE-2769-PRE/342] N84-13883
THERMAL CONDUCTIVITY
Measurement of thermal conductivity from high-temperature pulse diffusivity and calorimetry measurements
[DE84-000353] N84-13297
Low-cycle fatigue behavior of oxygen-free high-conductivity copper at 300OC in high vacuum
[DE84-000725] N84-13305
Automated thermal conductivity probe and applications to powders
[DE84-000451] N84-13328
Use of numerical heat-transfer techniques to analyze thermal-comparator conductivity measurements
[DE84-000945] N84-13515
THERMAL CYCLING TESTS
Characterization of the structure and substructure of thermally transformation cycled Cu-Zn-Al shape memory alloys
[AD-A132341] N84-13270
THERMAL DIFFUSION
Electrical and thermal modeling of railguns
[DE84-001361] N84-13387
Simulations and theoretical implications of KMS transport experiments for 1.05 micron and 0.53 micron laser radiation
[DE84-000824] N84-13570
THERMAL DIFFUSIVITY
Measurement of thermal conductivity from high-temperature pulse diffusivity and calorimetry measurements
[DE84-000353] N84-13297
THERMAL EXPANSION
Theoretical basis for design of thermal-stress-free fasteners
[NASA-TP-2226] N84-13614
THERMAL INSTABILITY
Thermal instability in transient compartment fire: An approach to characterize flashover and estimate its mechanisms N84-13366
THERMAL PROTECTION
Enhancement of the CAVE computer code --- aerodynamic heating package for nose cones and scramjet engine sidewalls
[NASA-CR-3731] N84-13501
THERMAL REACTORS
A practical sublimation source for large-scale chromium gettering in fusion devices
[DE84-000724] N84-14002
Ion-beam surface analysis in plasma-edge studies
[DE84-001578] N84-14004
THERMAL STABILITY
Cobalt ion-containing epoxies
[NASA-TM-85715] N84-13309
THERMAL STRESSES
Theoretical basis for design of thermal-stress-free fasteners
[NASA-TP-2226] N84-13614
THERMIONIC EMITTERS
Chemical vapor deposition of oriented tungsten foils for thermionic cathodes
[AD-A132379] N84-14040
THERMODYNAMIC EFFICIENCY
Flat-plate solar-collector performance data base and user's manual
[DE83-011993] N84-13682

THERMODYNAMIC PROPERTIES
Radial thermomechanical behaviour
[BLL-OA-TRANS-2639-(6196.3)] N84-13503
Prediction of multicomponent liquid-mixture viscosity from binary thermodynamic data
[DE83-011934] N84-13524
The effects of environment and dwell on high temperature fatigue crack growth of 2 1/4 Cr - 1 Mo steel
[AD-A132147] N84-13617
A composite analysis of a tropical squall-line system N84-13727
Analysis and modeling of photosynthetic bacterial hydrogen production plants
[DE84-000003] N84-13758
THERMODYNAMICS
INHYD: Computer code for intraply hybrid composite design. A users manual
[NASA-TP-2239] N84-13224
Thermodynamic surface for water: The formulation and computer programs
[PB83-249769] N84-13256
Thermomechanical processing of M-50 steel
[AD-A132272] N84-13271
T-HEMP3D user manual
[DE84-000526] N84-13845
THERMOELASTICITY
Approximate solution of the problem of thermoelasticity of a sphere with variable properties
[BLL-M-35369-(5826.4F)] N84-13606
THERMOELECTRIC COOLING
Parametric testing and evaluation of a free-piston Stirling engine/linear-compressor system
[DE83-017282] N84-13590
THERMOPLASTIC RESINS
Characterization of glass-filled engineering thermoplastic composites
[DE84-000361] N84-13231
Fire and smoke retardants N84-13343
THERMOSETTING RESINS
Processing science for AS/3501-6 carbon/epoxy composites
[AD-A132323] N84-13316
THICK FILMS
MM and T: Ceramic metal substrates for hybrid electronics
[AD-A132514] N84-13313
THICKENERS (MATERIALS)
Phase and compression behavior in sedimentation and thickening of liquid-solid suspensions
[PB83-249664] N84-13257
THIN FILMS
The effect of the structure of metallo-organic complexes on the electrolytic precipitation of titanium and niobium from nonaqueous electrolytes
[BLL-OA-TRANS-3070-(6196.3)] N84-13259
Plasma polymerized high energy density dielectric films for capacitors
[NASA-CR-168233] N84-13310
Superconducting niobium thin film slow-wave structures N84-13405
Deposition of cesium iodide on papylene
[DE83-017839] N84-13992
Fast, self-nulling spectroscopic ellipsometer: Instrumentation and application, revision
[DE83-015531] N84-13994
Magnetic properties of Mo/Ni superlattices
[DE84-000568] N84-14053
THIN WINGS
Solution of Poisson equations for 3-dimensional grid ganerations --- computations of a flow field over a thin delta wing
[NASA-TM-85857] N84-13886
THOMSON SCATTERING
Thomson-scattering measurements of electron temperature and density in a plasma channel created by a relativistic electron beam
[DE84-000356] N84-13940
THREE BODY PROBLEM
Splines and the Galerkin method for solving the integral equations of scattering theory
[CSIR-TWISK-267] N84-13873
THREE DIMENSIONAL FLOW
Development of a computer code for a three-dimensional higher order panel method for subsonic potential flow
[FFA-138] N84-13155
A computer program for the calculation of three-dimensional transonic nacelle/inlet flowfields
[NASA-CR-166528] N84-13159
Three-dimensional viscous design methodology for advanced technology aircraft supersonic inlet systems
[NASA-TM-83558] N84-13190
Computation of viscous flow in curved ducts and comparison with experimental data
[NASA-TM-83548] N84-13494
Experimental study of three-dimensional natural convection at high Rayleigh number
[DE83-011982] N84-13530
Solution of Poisson equations for 3-dimensional grid generations --- computations of a flow field over a thin delta wing
[NASA-TM-85857] N84-13886
THRUST REVERSAL
Internal pressure distributions for a two-dimensional thrust-reversing nozzle operating at a free-stream Mach number of zero
[NASA-TM-85655] N84-13161
Effect of thrust reverser operation on the lateral-directional characteristics of a three-surface F-15 model at transonic speeds
[NASA-TP-2234] N84-13165
THRUST VECTOR CONTROL
Thrust-induced effects on subsonic longitudinal aerodynamic characteristics of a vectored-engine-over-wing configuration
[NASA-TP-2228] N84-13163
TILT ROTOR AIRCRAFT
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-6, 211/November-Decemter 1982
[ESA-TT-801] N84-13382
TIME DEPENDENCE
An EPROM-based function generator N84-13408
TIME SERIES ANALYSIS
Data validation and summary for the NRL remote sensing experiment: Phelps Bank, July, 1982. Part 2: Meteorology
[AD-A132105] N84-13646
A user's guide to ARSPIQ: The univariate time series analysis program for autoregressive spectral information quantile identification
[AD-A132217] N84-13831
Time series long memory identification and quantile spectral analysis
[AD-A132240] N84-13900
The amplitude density function and high-resolution frequency analysis of time series
[AD-A132466] N84-13906
TIME SHARING
Development of a GIFTS (graphics-oriented interactive finite-element time-sharing system) plotting package compatible with either PLOT10 or IBM/DSM graphics
[AD-A132195] N84-13833
TIRES
Study of the contained air flow in a radial tire: Experimental
[DE84-000840] N84-13591
TISSUES (BIOLOGY)
Study of biological samples obtained from victims of MGM Grand Hotel fire N84-13374
TITANATES
Development of electrolysis-cell separator for 1250C operation. Advanced alkaline electrolysis cell development
[DE84-000439] N84-13484
TITANIUM
The effect of the structure of metallo-organic complexes on the electrolytic precipitation of titanium and niobium from nonaqueous electrolytes
[BLL-OA-TRANS-3070-(6196.3)] N84-13259
The electrodeposition of titanium coatings
[BLL-OA-TRANS-3057-(6196.3)] N84-13260
Investigation of the possibilities for the electrodeposition of titanium from non-aqueous solutions
[BLL-OA-TRANS-3069-(6196.3)] N84-13267
Current state of titanium coating methods
[BLL-OA-TRANS-3067-(6196.3)] N84-13268
TITANIUM ALLOYS
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 1: Microstructural response to neutron irradiation
[DE84-001298] N84-13283
Electrochemical etching of titanium-alloy castings
[DE84-000244] N84-13286
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-6, 211/November-Decemter 1982
[ESA-TT-801] N84-13382
TITANIUM CARBIDES
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 3. A model for the effect of titanium addition
[DE84-001296] N84-13281
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 2. Dual-ion irradiations
[DE84-001297] N84-13282
TOKAMAK DEVICES
Narrow-band, near-UV, high-repetition-rate laser-induced fluorescence system for use as an dge diagnostic in fusion machine
[DE84-000586] N84-13567
Experimental results on finite-beta limits and transport in the ISX-B Tokamak
[DE84-000258] N84-14001
Ion-beam surface analysis in plasma-edge studies
[DE84-001578] N84-14004
CTR plasma engineering studies
[DE84-001279] N84-14006
Hydrogen pellet injection into Alcator C
[DE83-016878] N84-14018
d-d Tokamak reactor assessment
[DE83-016127] N84-14019
Energetic-particle stabilization of ballooning modes in Tokamaks
[DE83-016205] N84-14020
Hamiltonian formulation of reduced magnetohydrodynamics
[DE83-016758] N84-14021
Variational theory of RF-driven currents
[DE83-016745] N84-14022
Background information and technical basis for assessment of environmental implications of magnetic fusion energy
[DE83-018300] N84-14030
TOMOGRAPHY
Tomographic technique in relativistic electron beam experiments
[DE84-000357] N84-13949
TOPOGRAPHY
Baroclinic waves in the atmosphere of Mars: Observations, linear instability, and finite-amplitude evolution N84-14094
TOPOLOGY
The specific solutions of a uniform algebraic differential equation of the second order
[ISSN-0066-1953] N84-13783
Twisted sums of nuclear Frechet spaces N84-13800
Quasiconformal mappings with free boundary components N84-13801
Splice and Malcev algebras N84-13911
Invariant means on semi-topological transformation semigroups N84-13912
TOROIDAL PLASMAS
Low-activation fusion-reactor design studies
[DE83-017688] N84-14014
TORQUE
Generalized plastic hinge concepts for 3D beam-column elements
[PB83-247981] N84-13391
TORSION
Lateral-torsional response of structures subjected to seismic waves
[PB83-239582] N84-13390
Digital instrumentation package or an improved torsion pendulum
[PB83-240424] N84-13547
TOTAL ENERGY SYSTEMS
Develop and test fuel cell powered on-site integrated total energy systems. Phase 3: Full-scale power plant development
[NASA-CR-168294] N84-13672
TOXIC DISEASES
Physiological function of combustion gas and especially that of CN N84-13376
TOXICITY
US-Japan cooperative research on evaluation of toxicity N84-13375
Dependence of evolution of toxic gases on burning conditions N84-13377
Proposed plan for joint research program between Japan, the USA and Canada concerning gas toxicity in fires N84-13378
TOXICITY AND SAFETY HAZARD
Present state of research in Japan on toxicities of gases during fire N84-13349
TOXICOLOGY
Event-related brain potentials: An alternative methodology for neurotoxicological research
[PB83-246116] N84-13775
TRAILING-EDGE FLAPS
Analysis of pressure distributions on a wing with an oscillating trailing edge flap in subsonic and transonic flow N84-13145
TRAINING ANALYSIS
Computer-based training starter kit
[PB83-248815] N84-13780
TRAINING DEVICES
Computer-based training starter kit
[PB83-248815] N84-13780
TRANSCENDENTAL FUNCTIONS
The specific solutions of a uniform algebraic differential equation of the second order
[ISSN-0066-1953] N84-13783
On the growth of the spherical derivative of a meromorphic function N84-13785

TRANSFERRING
Proceedings of the Third LAN-Transport Workshop. Report of the Third Workshop for Local Area Network Implementors of the NBS Specifications of the International Standards Organization Transport Class 4 Protocol Special Interest Group on File Transfer Protocol
[PB83-251348] N84-13857
TRANSFORMATIONS (MATHEMATICS)
Some grid generations using conformal mapping
[NAL-TR-758] N84-13871
Grid generation for cascades using conformal mapping
[NAL-TR-760] N84-13872
Advanced Hough transform implementations
[AD-A132522] N84-13890
Multivariate, minimum-curvature splines for randomly spaced data
[AD-A132319] N84-13899
Invariant means on semi-topological transformation semigroups N84-13912
TRANSIENT RESPONSE
Blade loss transient dynamics analysis with flexible bladed disk
[NASA-CR-168176] N84-13193
Phase locked loop theory and application: A precis paper
[CSIR-NIAST-82/57] N84-13444
TRANSITION METALS
Selective catalytic hydrogenation of polynuclear heteroaromatic nitrogen compounds with polymer-supported transition-metal compounds
[DE84-001326] N84-13248
TRANSITION TEMPERATURE
Relationship between the glass transition temperature and the chemical structure of polymers
[RAE-TRANS-2098] N84-13312
Relaxation in spin glasses: Similarities and differences from ordinary glasses
[DE84-001719] N84-13330
TRANSMITTANCE
Air mass computer program for atmospheric transmittance/radiance calculation: FSCATM
[AD-A132108] N84-13712
TRANSMUTATION
Development and fabrication of a high current, fast recovery power diode
[NASA-CR-168196] N84-13443
TRANSONIC FLOW
XTRAN2L: A program for solving the general-frequency unsteady transonic small disturbance equation
[NASA-TM-85723] N84-13150
A grid-embedding transonic flow analysis computer program for wing/nacelle configurations
[NASA-CR-166529] N84-13158
TRANSONIC WIND TUNNELS
Analysis of pressure distributions on a wing with an oscillating trailing edge flap in subsonic and transonic flow N84-13145
TRANSPIRATION
Transport assessment: Arid task. Model verification studies
[DE84-000121] N84-13653
TRANSPORT AIRCRAFT
Some thoughts concerning large load-carrying vehicles
[NASA-TM-85701] N84-13139
Aerodynamic characteristics, including effect of body shape, of a Mach 6 aircraft concept
[NASA-TP-2235] N84-13164
TRANSPORT PROPERTIES
Environmental impact research program. Two-equation, depth-integrated turbulence closure for modeling geometry-dominated flows
[AD-A132347] N84-13505
PATH: A lumped-element beam-transport simulation program with space charge
[DE84-001330] N84-13953
TRANSPORT THEORY
Development of multicomponent transport theory and transport data for membranes in concentrated electrolytes
[DE84-001846] N84-13249
Method of operator splitting or fractional steps and its applications to fluid-dynamic modelling
[DE84-000800] N84-13511
Simulations and theoretical implications of KMS transport experiments for 1.05 micron and 0.53 micron laser radiation
[DE84-000824] N84-13570
Beam dynamics in the Advanced Test Accelerator (ATA)
[DE84-001421] N84-13947
Steady-state hydrogen transport in solids exposed to fusion-reactor plasmas. Part 3: Applications of theory
[DE84-001646] N84-14033
TRAVELING WAVE MASERS
Superconducting niobium thin film slow-wave structures N84-13405
TRAVELING WAVES
Remarks on the Kuramoto-Sivashinsky equation
[DE84-001018] N84-13901
TREMORS
Stress assessment through voice analysis
[AD-A132577] N84-13773
TRIGGER CIRCUITS
A frequency stabilization and trigger control unit for hybrid TEA-CO2 lasers
[AD-A132247] N84-13552
TRITIUM
Electrolytic gettering of tritius from air
[DE84-000174] N84-13252
Reduction of tritium permeation through iron using aluminum-ion implantation
[DE84-000184] N84-13279
d-d Tokamak reactor assessment
[DE83-016127] N84-14019
TROMBE WALLS
Hybrid space heating/cooling system with Trombe wall, underground venting, and assisted heat pump
[DE84-000406] N84-13686
TROPOSPHERE
Proceedings of a Workshop on Assessment of Techniques for Measuring Tropospheric N sub x O sub y
[NASA-CP-2292] N84-13706
TUBES
Flame radiation and liner heat transfer in a tubular-can combustor
[NASA-TM-83538] N84-13188
TUNGSTEN
Tensile and low-cycle fatigue measurements on cross-rolled tungsten at 1505 K
[DE84-000805] N84-13273
Chemical vapor deposition of oriented tungsten foils for thermionic cathodes
[AD-A132379] N84-14040
Study of defects produced in tungsten by 800-MeV protons using field-ion microscopy
[DE84-001359] N84-14048
TUNING
High-Q perpendicular-biased ferrite-tuned cavity
[DE83-017291] N84-13478
TURBINE BLADES
Blade loss transient dynamics analysis with flexible bladed disk
[NASA-CR-168176] N84-13193
Wear during rubbing of a sintered metal powder body
[AD-A132354] N84-13584
TURBINE ENGINES
Range and endurance of jet-engined airplanes at constant altitude
[REPT-83-A1-SER-A] N84-13175
Blade loss transient dynamics analysis with flexible bladed disk
[NASA-CR-168176] N84-13193
Characterization of ceramic vane materials for 10KW turboalternator
[AD-A132505] N84-13196
PREWATE: An interactive preprocessing computer code to the Weight Analysis of Turbine Engines (WATE) computer code
[NASA-TM-83545] N84-13812
TURBOFAN ENGINES
Range and endurance of jet-engined airplanes at constant altitude
[REPT-83-A1-SER-A] N84-13175
Work done to determine the source of errors on conditioned pressure transduce signals in the JT9D-7F turbofan engines used on SAA Boeing 747 aircraft
[NIAST-82/78] N84-13192
PREWATE: An interactive preprocessing computer code to the Weight Analysis of Turbine Engines (WATE) computer code
[NASA-TM-83545] N84-13812
TURBOGENERATORS
Outline of methods for design of superconducting turbogenerators
[AD-A132528] N84-13451
TURBOMACHINERY
Design and evaluation of small water turbines
[DE84-000404] N84-13586
TURBULENCE
Recent progress at NBS in fire growth modeling N84-13372
A vertical wind angle standard deviation calculation method for the unstable surface boundary layer
[AD-A132362] N84-13739
TURBULENCE EFFECTS
Investigation of the wall pressure, wall shear stress and velocity fields associated with a turbulent spot in a laminar boundary layer N84-13488
TURBULENT FLOW
XTRAN2L: A program for solving the general-frequency unsteady transonic small disturbance equation
[NASA-TM-85723] N84-13150
A theoretical and experimental study of turbulent particle-laden jets
[NASA-CR-166293] N84-13187
Numerical modeling of turbulent flow in a channel
[NASA-CR-168278] N84-13189
PDF: A computer program for calculation of turbulent combustion utilizing a Probability Density Function (PDF) approach
[DE84-000999] N84-13240
Experiments on mixing and combustion with low heat release in a turbulent shear flow N84-13489
A fully vectorized numerical solution of the incompressible Navier-Stokes equations
[NASA-CR-174498] N84-13491
New relationships for turbulent plumes
[NAL-TR-763] N84-13495
Environmental impact research program. Two-equation, depth-integrated turbulence closure for modeling geometry-dominated flows
[AD-A132347] N84-13505
Turbulent wall pressure simulation
[AD-A132297] N84-13507
Computation of turbulent reacting flows: Comparison of various mixing/chemistry interaction models
[DE84-000998] N84-13514
Computations of turbulent recirculating flows with fully coupled solution of momentum and continuity equations
[DE84-001529] N84-13518
Finite-element analysis of incompressible laminar and turbulent flow with heat transfer
[DE84-000042] N84-13523
TURBULENT JETS
Investigation of axisymmetric confined turbulent jet mixing in the near region with adverse pressure gradient N84-13148
Measurement of velocity distributions in turbulent jets using a laser Doppler velocimeter
[AD-A132316] N84-13506
TURBULENT MIXING
Investigation of axisymmetric confined turbulent jet mixing in the near region with adverse pressure gradient N84-13148
TWO BODY PROBLEM
Splines and the Galerkin method for solving the integral equations of scattering theory
[CSIR-TWISK-267] N84-13873
TWO DIMENSIONAL FLOW
Numerical modeling of turbulent flow in a channel
[NASA-CR-168278] N84-13189
The quantum hall effect N84-14036
Two-dimensional accretion disk structure and stability N84-14090
TWO PHASE FLOW
Equations governing the liquid-film flow over a plane with heat flux and interfacial phase change
[DE83-017528] N84-13525
Forced two-phase cooling of the TPC superconducting solenoid
[DE83-017749] N84-14049

U

ULTRAHIGH FREQUENCIES
RF performance of a proposed L-band antenna system N84-13410
L band low noise amplifier project
[NPE-2794-PRE/356] N84-13445
ULTRALOW TEMPERATURES
A helium refrigerator with features for supercritical pressure cooling
[DE84-017759] N84-13383
ULTRASONIC CLEANING
Vapor degreaser/ultrasonic cleaner solvent evaluation
[DE84-002015] N84-13331
ULTRASONIC FLAW DETECTION
Ultrasonic 3-D reconstruction of inclusions in solids using the inverse Born algorithm
[DE83-018082] N84-13928
Development of ultrasonic methods for the nondestructive inspection of concrete
[DE83-017923] N84-13929
Effects of a finite aperture on the inverse born approximation
[DE83-018086] N84-13930
ULTRASONIC RADIATION
Effects of crack closure on ultrasonic transmission
[DE83-018073] N84-13599
Absolute determination of stress in textured materials
[DE83-018083] N84-13621

ULTRASONIC TESTS
Characterization of carbon fiber composites using acousto-ultrasonic techniques
[AD-A132305] N84-13317
Computer-based ultrasonic multiple-frequency pulse-echo test system
[AD-A132227] N84-13926
ULTRAVIOLET RADIATION
Impact of enhanced solar UV-B radiation upon the marine ecosystem
[PB83-247411] N84-13694
UNDERGROUND STRUCTURES
Physics at the proposed National Underground Science Facility
[DE84-001345] N84-13203
Physical modeling of the champagne effect
[DE84-001813] N84-13388
UNDERGROUND TRANSMISSION LINES
Service experience of EDF 20 kV XLPe insulated cable
[BLL-OA-TRANS-2633-(6196.3)] N84-13448
UNDERWATER ACOUSTICS
Optimum depth of propagation in shallow water
[AD-A132182] N84-13927
A survey of underwater-acoustic ray tracing techniques
[PB83-250522] N84-13931
UNITED KINGDOM
Fiber composite materials research in the UK: Assessment report
[AD-A132386] N84-13226
The United Kingdom SATMaP program
[E84-10002] N84-13627
UNITED STATES OF AMERICA
A proposed RF-technology R/D plan for the United States
[DE84-000643] N84-13434
UNIVERSITIES
Fiber composite materials research in the UK: Assessment report
[AD-A132386] N84-13226
UNSTEADY FLOW
XTRAN2L: A program for solving the general-frequency unsteady transonic small disturbance equation
[NASA-TM-85723] N84-13150
Embedded cavity drag in steady and unsteady flows
[NASA-CR-172275] N84-13493
URANIUM
Assessment of quality of data on tapes from the hydrogeochemical and stream sediment reconnaissance
[DE83-017697] N84-13647
URANIUM 235
Aerial radiological survey of Area 11, Nevada Test Site
[DE84-000440] N84-13650
USER MANUALS (COMPUTER PROGRAMS)
Programmer's manual for the fire safety evaluation system cost minimizer computer program
[PB83-251447] N84-13395
User's manual for CABLE: A three-dimensional, finite-segment computer code for submerged and partially submerged cable systems
[AD-A132515] N84-13821
A user's guide to ARSPIC: The univariate time series analysis program for autoregressive spectral information quantile identification
[AD-A132217] N84-13831
FASTBUS diagnostic language users manual, version 3[74]
[DE83-017932] N84-13837
T-HEMP3D user manual
[DE84-000526] N84-13845
USER REQUIREMENTS
User's guide to Sandia TEX
[DE83-016763] N84-13840
UTILITIES
Analysis of lead-acid battery accelerated testing data
[DE83-017403] N84-13473

V

VACANCIES (CRYSTAL DEFECTS)
Fourth Europhysical Conference on Lattice Defects in Ionic Crystals
[AD-A132387] N84-14039
Host-lattice effects in the spin-orbit fine structure of vacancy-trapped electrons
[DE84-000599] N84-14052
VACUUM
Vacuum outgassing of various materials
[DE84-001449] N84-13247
Low-cycle fatigue behavior of oxygen-free high-conductivity copper at 3000C in high vacuum
[DE84-000725] N84-13305
VACUUM TESTS
Measurement of friction and wear on modified surfaces
[AD-A132364] N84-13583
VALVES
Investigation of the generation of regular waves by a sliding valve pneumatic wave generator
[CSIF-RR-553] N84-13579
VANADIUM ALLOYS
Effect of implanted helium on the microstructure and creep properties of ordered (Fe0.49 Ni0.51)V-3 alloys
[DE84-000691] N84-13278
VAPOR DEPOSITION
Deposition of cesium iodide on papylene
[DE83-017839] N84-13992
Chemical vapor deposition of oriented tungsten foils for thermionic cathodes
[AD-A132379] N84-14040
VAPOR PHASES
Vapor-phase heat-transport system
[DE84-001341] N84-13516
VAPORS
Diffusion and sorption of cyclohexane vapor in SBS and SBR copolymers
[AD-A132397] N84-13315
VARIABLE STARS
Studies of cataclysmic variables N84-14084
VARIANCE (STATISTICS)
Kriging of geological and physical parameters from Yucca Flat, NTS
[DE83-018227] N84-13625
VECTOR ANALYSIS
Results of the Australian geodetic VLBI experiment N84-13416
VECTOR SPACES
Twisted sums of nuclear Frechet spaces N84-13800
Convolution of generalized vector measures N84-13803
VECTORS (MATHEMATICS)
Vectorizing and machine-spanning techniques
[DE84-000469] N84-13810
Acceleration of convergence of vector sequences
[NASA-TP-2193] N84-13885
VELOCITY
Study of the contained air flow in a radial tire: Experimental
[DE84-000840] N84-13591
VELOCITY DISTRIBUTION
Measurement of velocity distributions in turbulent jets using a laser Doppler velocimeter
[AD-A132316] N84-13506
Further studies on equal-order interpolation for Navier-Stokes
[DE84-000916] N84-13512
VELOCITY MEASUREMENT
Finite elements and the divergence constraint for viscous flows N84-13486
Measurement of velocity distributions in turbulent jets using a laser Doppler velocimeter
[AD-A132316] N84-13506
VENTING
Hybrid space heating/cooling system with Trombe wall, underground venting, and assisted heat pump
[DE84-000406] N84-13686
VERTICAL AIR CURRENTS
New relationships for turbulent plumes
[NAL-TR-763] N84-13495
VERTICAL MOTION
A composite analysis of a tropical squall-line system N84-13727
VERY LARGE SCALE INTEGRATION
VLSI architectures for computing multiplications and inverses in GF(2-m) N84-13406
Wafer-scale integration of systolic arrays
[AD-A132536] N84-13450
Planar embedding of planar graphs
[AD-A132538] N84-13820
VERY LONG BASE INTERFEROMETRY
Orbit determination of highly elliptical Earth orbiters using VLBI and delta VLBI measurements N84-13402
Results of the Australian geodetic VLBI experiment N84-13416
VESTIBULAR TESTS
Technology evaluation of man-rated acceleration test equipment for vestibular research
[NASA-CR-172160] N84-13781
VIBRATION DAMPING
Digital instrumentation package or an improved torsion pendulum
[PB83-240424] N84-13547
Stability, vibration and passive damping of partially restrained imperfect columns
[NASA-TM-85697] N84-13608
VIBRATION EFFECTS
Optical methods of measuring loudspeaker diaphragm movement
[BBC-RD-1983/13] N84-13396
The dynamic in plane response at the centre of a rotating elastic disc due to oscillatory in plane forces at the rim
[ISVR-TR-121] N84-13613
VIBRATION MODE
Blade loss transient dynamics analysis with flexible bladed disk
[NASA-CR-168176] N84-13193
VIBRATIONAL SPECTRA
Vibrational spectroscopy of chemisorbed molecules by infrared emission
[DE84-000956] N84-13973
VIBRATIONAL STRESS
Dissociative ionization of liquid water induced by vibrational overtone excitation
[DE83-017739] N84-13251
VIBRATORY LOADS
Probabilistic fatigue life predictions of structural components in high-cycle fatigue regimes
[AD-A132425] N84-13615
VIDEO DATA
Study of potential standardization of video teleconferencing systems, Volume 2: Appendices
[AD-A132081] N84-13431
Study of potential standardization of video teleconferencing systems, volume 1
[AD-A132080] N84-13432
The development and application of an advanced computer-based shared-graphic workstation for video teleconferencing
[AD-A132583] N84-13817
VIEW EFFECTS
Computer implementation, accuracy, and timing of radiation view-factor algorithms
[DE83-017618] N84-13849
VIRTUAL MEMORY SYSTEMS
Design and implementation of a BASIC cross-compiler and virtual memory management system for the TI-59 programmable calculator
[AD-A132172] N84-13808
VISCOELASTICITY
An analysis of acoustic and seismic wave resonances N84-13701
VISCOPLASTICITY
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-2, 207/March-April 1982
[ESA-TT-759] N84-13143
VISCOSITY
The effect of surface charge on the rheology of concentrated aqueous quartz suspensions
[CSIR-CENG-423] N84-13235
Pseudospectral solution of inviscid flows with multiple discontinuities
[AD-A132084] N84-13510
Prediction of multicomponent liquid-mixture viscosity from binary thermodynamic data
[DE83-011934] N84-13524
Postglacial rebound observed by Lageos and the effective viscosity of the lower mantle
[NASA-TM-84982] N84-13705
VISCOUS FLOW
A viscous-inviscid interactive procedure for rotational flow in cascades of two dimensional airfoils of arbitrary shape
[NASA-CR-174609] N84-13149
Three-dimensional viscous design methodology for advanced technology aircraft supersonic inlet systems
[NASA-TM-83558] N84-13190
Finite elements and the divergence constraint for viscous flows N84-13486
The disturbance flow field produced by an evolving vortex
[NASA-TP-2245] N84-13500
VISIBILITY
The effects of character stroke width on the visibility of a head-coupled display
[AD-A132046] N84-13183
Size of letters required for visibility as a function of viewing distance and observer visual acuity
[PB83-250589] N84-13782
VISUAL ACUITY
Size of letters required for visibility as a function of viewing distance and observer visual acuity
[PB83-250589] N84-13782
VISUAL FLIGHT RULES
Aircraft accident report - A. E. Staley Manufacturing Company, Inc., Canadair Challenger CL-600, N805C, Hailey, Idaho, January 3, 1983
[PB83-910405] N84-13169
VISUAL PERCEPTION
Four frames suffice. A provisionary model of vision and space
[AD-A132359] N84-13825

VOICE
Stress assessment through voice analysis
[AD-A132577] N84-13773
VOICE COMMUNICATION
Wideband integrated Voice/Data technology
[AD-A132284] N84-13421
VOID RATIO
Elastic-wave scattering from multiple voids (porosity)
[DE83-018076] N84-13598
VOIDS
Elastic-wave scattering from multiple voids (porosity)
[DE83-018076] N84-13598
VOLTAGE CONTROLLED OSCILLATORS
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-6, 211/November-Decemter 1982
[ESA-TT-801] N84-13382
VOLTAGE GENERATORS
China builds first 6000kV type pulse voltage generator
[AD-A132564] N84-13449
VOLUMETRIC ANALYSIS
Description of a method and artifact for estimating volumetric uncertainty of coordinate measuring machines
[DE84-002017] N84-13545
VOMITING
Motion sickness incidence: Distribution of time to first emesis and comparison of some complex motion conditions
[AD-A131930] N84-13772
VORTEX FLAPS
Vortex flap flow reattachment line and subsonic longitudinal aerodynamic data on 50 deg to 74 deg Delta wings on common fuselage
[NASA-TM-84618] N84-13160
VORTICES
A viscous-inviscid interactive procedure for rotational flow in cascades of two dimensional airfoils of arbitrary shape
[NASA-CR-174609] N84-13149
The disturbance flow field produced by an evolving vortex
[NASA-TP-2245] N84-13500
Further studies on equal-order interpolation for Navier-Stokes
[DE84-000916] N84-13512
Vortex shedding and laser ablation
[DE84-000301] N84-13565
VORTICITY
Calculation of natural convection within a heated enclosure using the method of second moments
[DE84-001596] N84-13517
The influence of convective activity on the vorticity budget
[NASA-CR-3752] N84-13736

W

WAFERS
Wafer-scale integration of systolic arrays
[AD-A132536] N84-13450
WAKES
Analytical model of rotor wake aerodynamics in ground effect
[NASA-CR-166533] N84-13157
WALL PRESSURE
Turbulent wall pressure simulation
[AD-A132297] N84-13507
WALLS
Investigation of the wall pressure, wall shear stress and velocity fields associated with a turbulent spot in a laminar boundary layer N84-13488
WASTE DISPOSAL
Ecological Research Division marine research program
[DE83-017880] N84-13691
Mobility of organic complexes of nickel and cobalt in soils
[DE83-017897] N84-13720
WASTE ENERGY UTILIZATION
Performance test results of an absorption heat pump which is designed to utilize low-temperature 600C (1400F) industrial waste heat
[DE83-017194] N84-13533
WASTE HEAT
Performance test results of an absorption heat pump which is designed to utilize low-temperature 600C (1400F) industrial waste heat
[DE83-017194] N84-13533
WATER
Dissociative ionization of liquid water induced by vibrational overtone excitation
[DE83-017739] N84-13251
Thermodynamic surface for water: The formulation and computer programs
[PB83-249789] N84-13256
The effect of water on the dielectric performance of a cable
[BLL-OA-TRANS-2634-(6196.3)] N84-13447
WATER FLOW
Transport assessment: Arid task. Model verification studies
[DE84-000121] N84-13653
WATER POLLUTION
Ecological Research Division marine research program
[DE83-017880] N84-13691
Calibration of laboratory bioassays with results from microcosms and ponds
[DE83-017224] N84-13692
Use of fauna as biomonitors
[DE83-016082] N84-13762
WATER QUALITY
Survey of water quality and flow in Maryland coastal zone streams: A data report
[PB83-249375] N84-13660
WATER RESOURCES
Photo interpretation key to Michigan land cover/use
[E84-10048] N84-13641
Proceedings of the 3rd LAN-Transport Workshop. Report of the third workshop for local area network implementors of the NBS specifications of the International Standards Organization transport class 4 protocol: Special interest group on file transfer protocol
[PB83-251348] N84-13657
WATER VAPOR
Thermodynamic surface for water: The formulation and computer programs
[PB83-249789] N84-13256
WATER WAVES
The nature and analysis of random waves in shallow water. Part 1: Text and figures
[CSIR-RR-388/1-PT-1] N84-13496
The nature and analysis of random waves in shallow water. Part 2: Appendices
[CSIR-RR-388/2-PT-2] N84-13497
Investigation of the generation of regular waves by a sliding valve pneumatic wave generator
[CSIF-RR-553] N84-13579
WATERSHEDS
Development of design hyetographs for southern Nevada
[DE84-001227] N84-13649
Parametric model for peak flow prediction in ungaged ephemeral watersheds
[PB83-249698] N84-13658
WAVE ATTENUATION
Propagation effects on satellite systems at frequencies below 10 GHz, a handbook for satellite systems design, 1st edition
[NASA-RP-1108] N84-13397
WAVE EQUATIONS
An introduction to the parabolic equation for acoustic propagation
[AD-A132315] N84-13925
WAVE FRONT DEFORMATION
Deformable subreflector computed by geometric optics N84-13407
WAVE GENERATION
Investigation of the generation of regular waves by a sliding valve pneumatic wave generator
[CSIF-RR-553] N84-13579
WAVE PROPAGATION
Air-breakdown limits for microwave-pulse propagation. Part 1. Experiments
[DE83-017832] N84-13438
Propagation of a radio-frequency pulsed signal over the Earth. The JOLLY programs
[DE84-000109] N84-13439
Further investigations of the multiple knife-edge attenuation function
[PB83-245043] N84-13442
Effects of crack closure on ultrasonic transmission
[DE83-018073] N84-13599
WAVEGUIDES
External wave-launcher study
[DE84-001124] N84-13441
WEAK INTERACTIONS (FIELD THEORY)
Physics with polarized beams in e+e(-) colliders
[DE83-016441] N84-13976
WEAPON SYSTEMS
An overview of aerodynamic research and technology requirements as related to some military needs
[NASA-TM-85691] N84-13138
WEAR
Surface contact wear and abrasive wear in lubricated sliding mechanisms N84-13573
WEAR TESTS
Wear during rubbing of a sintered metal powder body
[AD-A132354] N84-13584
WEATHER
An aid for using the Revised Uniform Summary of Surface Weather Observations (RUSSWOs)
[AD-A132186] N84-13742
WEATHER FORECASTING
Development of a technique for short-term prediction of hydrometeors using advection and physical forcing
[AD-A132259] N84-13740
Satellite activities of NOAA (National Environmental Satellite Data and Information Service) 1982
[PB83-252510] N84-13747
WEATHERING
Matrix approach to testing mirrors, part 2
[DE83-011996] N84-13676
WEIGHT (MASS)
PREWATE: An interactive preprocessing computer code to the Weight Analysis of Turbine Engines (WATE) computer code
[NASA-TM-83545] N84-13812
WEIGHTING FUNCTIONS
Interacting weights in multiple attribute decision making
[CSIR-TWISK-270] N84-13674
Multisignal Minimum-Cross-Entropy spectrum analysis weighted priors
[AD-A132358] N84-13896
WEIGHTLESSNESS
Weightlessness and management of liquid rocket propellant
[AD-A132516] N84-13334
WELLS
Seismic investigation of the Multi-Well Experiment site
[DE84-000943] N84-13655
WETLANDS
Photo interpretation key to Michigan land cover/use
[E84-10048] N84-13641
WHITE NOISE
Nonlinear acoustics in a dispersive continuum: Random waves, radiation pressure, and quantum noise N84-13920
WIDEBAND COMMUNICATION
Wideband integrated Voice/Data technology
[AD-A132284] N84-13421
WIDTH
Effective-width model for evacuation flow N84-13362
WIGGLER MAGNETS
Simulation of a high-gain tapered-wiggler free-electron laser
[DE84-001237] N84-13557
WIND (METEOROLOGY)
Range reference atmosphere 0-70 km altitude
[AD-A132487] N84-13737
A vertical wind angle standard deviation calculation method for the unstable surface boundary layer
[AD-A132362] N84-13739
WIND MEASUREMENT
Comparison of low-altitude wind-shear statistics derived from measured and proposed standard wind profiles
[NASA-TM-85668] N84-13172
WIND PROFILES
Comparison of low-altitude wind-shear statistics derived from measured and proposed standard wind profiles
[NASA-TM-85668] N84-13172
WIND SHEAR
Comparison of low-altitude wind-shear statistics derived from measured and proposed standard wind profiles
[NASA-TM-85668] N84-13172
WIND TUNNEL MODELS
Effect of thrust reverser operation on the lateral-directional characteristics of a three-surface F-15 model at transonic speeds
[NASA-TP-2234] N84-13165
WIND TUNNEL TESTS
Tabulation of data from tests of an NPL 9510 airfoil in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TM-84579] N84-13151
An approximate method of estimating the aerodynamic interference between two parallel bodies (normal force and side force)
[NAL-TR-752] N84-13154
Flight testing the Rotor Systems Research Aircraft (RSRA)
[NASA-TM-85852] N84-13177
High altitude aerodynamic tests with simulated heat-shield outgassing
[AD-A132078] N84-13227
Response of flame spread phenomena to ambient air stream velocity changes N84-13373
Experiments on mixing and combustion with low heat release in a turbulent shear flow N84-13489
WIND TURBINES
MOD-2 wind turbine development
[NASA-TM-83460] N84-13670

WIND VELOCITY
A comparison of frequency determination using real sodar data
[DE83-017942] N84-13718
Range reference atmosphere 0-70 km altitude
[AD-A132487] N84-13737
County-level wind resource estimates for DOE Region 5
[DE84-000009] N84-13744
WINDOWS (APERTURES)
Field maintenance of radiation-shielding windows at HFEF
[DE83-015376] N84-13326
WINDPOWER UTILIZATION
MOD-2 wind turbine development
[NASA-TM-83460] N84-13670
County-level wind resource estimates for DOE Region 5
[DE84-000009] N84-13744
WING NACELLE CONFIGURATIONS
A grid-embedding transonic flow analysis computer program for wing/nacelle configurations
[NASA-CR-166529] N84-13158
WIRE
The effect of condensate inundation on steam condensation heat transfer to wire-wrapped tubing
[AD-A132175] N84-14060
WORD PROCESSING
Communicating between the IBM personal computer and the Wang word-processing system
[DE83-017987] N84-13809
Short introduction to office applications of markup language
[DE83-011400] N84-13844
WORK
Women at work and stress
[R/PERS-626] N84-13777

X

X RAY ANALYSIS
Investigation of soft X-ray reflective coatings
[DE84-000510] N84-14025
X RAY ASTRONOMY
The development of an imaging gas scintillation proportional counter for use in X-ray astronomy N84-14079
X RAY DIFFRACTION
Petrographic examination of Bell Canyon Tests (BCT) 1-FF field grouts over a 3-year period
[DE83-016226] N84-13654
X-ray and backscattering analysis of ion implantation phenomena in GaAs and related compounds
[AD-A132429] N84-14038
X RAY SOURCES
Theory of optical flashes
[DE84-001450] N84-14106
X RAY SPECTRA
A study of thick-target X-ray spectra using photonuclear reactions
[AD-A132543] N84-13934
Soft X-ray spectral observations of quasars and high X-ray luminosity Seyfert galaxies
[NASA-TM-85118] N84-14082
Loop coalescence in flares and coronal X-ray brightening
[DE83-013070] N84-14099
X RAY STRESS MEASUREMENT
The measurement of elastic constants for the determination of stresses by X-rays
[AD-A132330] N84-13897
X RAYS
Recommended values of the humidity correction factor k sub h for determining exposure in an X-ray beam with free-air chambers
[JEN-542] N84-13915
Determining stresses in the presence of nonlinearities in interplanar spacing versus Sin squared Psi
[AD-A132365] N84-14041
XENON CHLORIDE LASERS
Update of pulsed-laser processing technology for high-efficiency silicon solar cells
[DE84-000638] N84-13684

Y

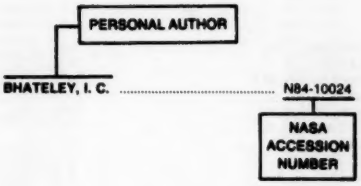
YIELD
Yields photosynthetic efficiencies, and proximate chemical composition of dense cultures of marine microalgae, a subcontract report
[DE83-011992] N84-13757
YTTRIUM ALLOYS
Diffusivities of hydrogen in yttrium and yttrium alloys
[DE84-000411] N84-13296

Z

ZEOLITES
The role of the tetrapropylammonium template in the synthesis of zeolite ZSM-5
[CSIR-CENG-413] N84-13236
ZETA PINCH
Design of a high-brightness, low-jitter, short-pulse laser for plasma diagnostics
[DE84-000129] N84-13564
The MHD stability of inertia-tied Z-pinches with application to solar coronal loops N84-13932
Simulation studies on a novel betatron injection scheme
[DE84-001337] N84-13946
High-density Z-pinch research
[DE83-017311] N84-14013
ZINC ALLOYS
Characterization of the structure and substructure of thermally transformation cycled Cu-Zn-Al shape memory alloys
[AD-A132341] N84-13270
ZINC-BROMIDE BATTERIES
Development of a circulating zinc-bromine battery, phase 2
[DE84-001886] N84-13463

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

ACKERMAN, J. P. N84-13469
N84-13480
ACKERMAN, R. A. N84-13529
ACREE, C. W., JR. N84-13178
ADAMS, J. J. N84-13182
ADLER, R. F. N84-13735
ADLER, R. J. N84-13954
AGGARWAL, J. K. N84-13389
AHLBERG, L. N84-13620
AHRENS, L. A. N84-13476
AHRENS, T. J. N84-13704
AITA, O. N84-14055
AKIMOV, V. Y. N84-13267
AKITA, K. N84-13342
N84-13353
N84-13364
N84-13365
AL-RUWAIS, A. S. N84-13427
ALBRIGHT, J. N. N84-13719
ALDEN, M. N84-13757
ALEXIADES, V. N84-13284
ALLAN, S. N84-13843
ALLEN, G. R. N84-13940
ALLEN, L. H. N84-13405
ALTAN, T. N84-13582
ALTHOUSE, L. P. N84-13339
ALVAREZ, R. A. N84-13438
ALVORD, D. N84-13361
AMBROSE, K. R. N84-13759
AMBROSINO, J. R. N84-13600
AMER, N. M. N84-13680
ANDERSON, B. H. N84-13190
ANDERSON, C. E., JR. N84-13225
ANDERSON, D. N84-13384
ANDERSON, E. R. N84-13675
ANDERSON, J. A. N84-13697
ANDERSON, R. B. N84-13733
ANDREWS, J. S. N84-13670
ANDREWS, R. A. N84-13386
ANTAL, L. N84-13451
ANTONIAK, Z. N84-13590
ANUTA, P. E. N84-13629
ANZIC, G. N84-13399
APPLETON, B. R. N84-14004
N84-14045
APTS, C. W. N84-13752
ARIGA, S. N84-13340
ARON, K. N84-13238
ARONSON, S. A. N84-13476
ARUMARAJ, Y. E. N84-13788
ASH, R. L. N84-13507
ASHBEE, K. H. G. N84-13320
ASHBY, C. I. H. N84-13960
ASUKA, M. N84-13394
ATHALE, R. A. N84-13430
ATKINS, D. F. N84-13979
ATKINSON, P. N84-13627
ATTA, E. H. N84-13158
N84-13159
AUTRY, A. N. N84-13686
AVERETT, W. R. N84-13647
AVIGNONE, F. T., III N84-13944
AVILES, P. N84-13787
AYRES, D. S. N84-13980
AZEVEDO, E. G. N84-13250

B

BABU, G. N. N84-13321
BACA, T. J. N84-13619
BACH, L. N84-13193
BACKSTROM, R. C. N84-13977
BAER, D. R. N84-13302
BAGWELL, J. W. N84-13400
BAI, T. N84-14098
BAILEY, C. N84-14067
BAILEY, E. E. N84-14070
BAKER, J. N84-13627
BAKER, J. R. N84-13631
BAKER, Q. A., JR. N84-13340
BALIEIRO, M. G. N84-13632
BALODIS, V. N84-13443
BANSAL, R. N84-13418
BARABOSHKIN, A. N. N84-13260
BARCLAY, J. A. N84-13307
BARE, E. A. N84-13152
N84-13165
BARGHUSEN, J. J. N84-13466
BARIN, K. N84-13769
BARKER, J. L. N84-13636
BARKER, L. K. N84-13866
BARKER, R. J. N84-13470
BARLETTA, W. A. N84-13947
BARNES, G. R. N84-13183
BARNES, J. R. N84-14094
BARRERA, F. N84-13467
N84-14049
BARRETT, S. A. N84-13987
BARSCH, G. R. N84-13461
N84-14043
BARTELL, S. M. N84-13698
BARTH, S. N84-13987
BARTON, M. Q. N84-13963
BASSETT, B. E. N84-13771
BATES, A. N84-13677
BATES, S. C. N84-14001
BATHKER, D. A. N84-13410
BAUSER, M. N84-13381
BAUTISTA, J. J. N84-13405
BAXTER, D. C. N84-14019
BAYARD, C. N84-13503
BEASLEY, M. R. N84-13405
BEAT, T. G. N84-13247
BEAVER, B. N84-13786
BECHTOLD, W. A. N84-13663
BECK, T. R. N84-13249
BECKER, R. N84-13312
BECRAFT, W. R. N84-13434
BEESTON, J. M. N84-13277
BEEVERS, H. N84-13766
BELLOWS, R. N84-13463
BELLUM, J. C. N84-13550
BENDER, L. U. N84-13643
BENJAMIN, T. M. N84-14097
BENNION, D. N. N84-13462
BERGER, D. N84-14032
BERGER, D. D. N84-13247
BERMAN, A. H. N84-13443
BERRIER, B. L. N84-13152
BERRY, R. A. N84-13511
BHAKTA, S. D. N84-13462
BHATTACHARYYA, P. N84-13788
BIDDLE, A. P. N84-13933
BIEG, K. W. N84-14010
BIESER, F. N84-13384
BIGGERS, J. V. N84-13461
N84-14043
BILTOFT, C. N84-13739
BIRDSEY, R. A. N84-13665
BIRKY, M. N84-13350
N84-13374
BIRX, D. L. N84-13947
BLACK, G. N84-13193
BLANFORD, M. L. N84-13840
BLANKENSHIP, P. E. N84-13421
BLEA, J. N84-13676
BLOSSER, M. L. N84-13614
BLOTTNER, F. G. N84-13585
BLUMENTHAL, D. L. N84-13697
BOBOWIEC, P. W. N84-13270
BOBROFF, N. N84-14078
BODNER, S. E. N84-13556
BOES, E. C. N84-13687
BOHN, M. S. N84-13530
BOLAND, J. M. N84-13486
BORIS, J. P. N84-13556
N84-13565
BORNSTEIN, J. G. N84-13683
BOSLOUGH, M. B. N84-13704
BOSSI, R. H. N84-13600
BOULTER, J. F. N84-13425
BOURJOT, P. N84-13503
BOWDEN, J. N. N84-13332
BOWLING, J. W. N84-13698
BOWMAN, D. E. N84-13464
BOYD, I. H. N84-13734
BOYDEN, R. P. N84-13162
BRACKBILL, J. U. N84-13850
BRADLEY, E. N84-13186
BRADLEY, E. R. N84-13303
N84-14026
BRAGA, J. N84-14083
BRAKEFIELD, J. C. N84-13773
BRANDENBURG, J. E. N84-13940
N84-14010
BRANNIGAN, M. N84-13873
BRASKI, D. N. N84-13288
BRENNAN, A. M. N84-13724
BRENNER, I. S. N84-13746
BREWER, L. N84-13274
BRICE, D. K. N84-14033
BRIGGS, R. J. N84-13947
BRIMHALL, J. L. N84-13302
N84-13304
BROCK, D. N84-13647
BRODZINSKI, R. L. N84-13944
BROKL, S. S. N84-13409
BROOKS, S. L. N84-13842
BROSED, A. N84-13915
BROSNAN, M. J. N84-13197
BROWN, C. M. N84-13890
BROWN, D. P. N84-13383
N84-13385
N84-13944
BROWN, D. W. N84-13279
BROWN, G. M. N84-13254
BRUNEL, F. N84-14099
BRYAN, J. L. N84-13352
N84-13358
N84-13359
BUCK, O. N84-13599
N84-13620
BUCKLEY, D. H. N84-13577
BUDNICK, J. I. N84-13298
N84-13299
BUI, T. N. N84-13892
BUIVAN, A. N84-14083
BURCH, R. E. N84-13471
BURK, H. O. N84-13501
BURKES, J. P. N84-13654
BURNETT, D. S. N84-14097
BURNETT, M. N84-13587
BURNETT, R. A. N84-14069
BURNS, K. C. N84-13772
BUSH, C. E. N84-14001
BUSH, H. G. N84-13608
BUSHAW, B. A. N84-13571
BUSSOLETTI, J. E. N84-13153
BUTLER, T. A. N84-13759
BUTTERFIELD, A. J. N84-13781
BYER, R. L. N84-13548
BYRNE, D. P. N84-13438

C

CABOT, M. A. N84-13920
CABOT, W. H. N84-14090
CAHIR, J. J. N84-13740
CALAWAY, W. F. N84-13567
CALDERON, M. O. N84-13995
CALLAND, W. E. N84-13741
CALLAS, J. N84-13476
CAMNIER, J. L. N84-13987
CAMORA, F. J. N84-13393
CAMPANA, M. E. N84-13658
CAMPBELL, C. T. N84-13246
CANEBA, G. T. N84-13315
CANNON, J. B. N84-14030
CAPORASO, G. J. N84-13947
CARLILE, D. W. N84-13762
CARLINI, R. D. N84-13478
CARLSON, C. H. N84-13195
CARLSON, F. M. N84-13211
CARPENTER, J. F. N84-13316
CARRARA, V. N84-13209
CARRERAS, B. A. N84-14001
CARROLL, D. N84-13439
CARTER, J. G. N84-14017
CARTIER, S. L. N84-13996
CASADO, J. N84-13815
CASPI, S. N84-13520
CASTLE, K. R. N84-13637
CASTLEMAN, A. W., JR. N84-13562
N84-13917
CATHCART, J. V. N84-13288
CAUGHLIN, D. J., JR. N84-13214
CESS, R. D. N84-13722
CHAMBERS, N. C. N84-13773
CHAMIS, C. C. N84-13224
CHAN, S. T. N84-13689
CHANCE, J. E. N84-13642
CHANDRASEKHRAN, V. N84-14057
CHANG, C. B. N84-13422
CHANG, J. N84-13949
CHAO, B. T. N84-13908
CHAO, D. F. K. N84-13490
CHAPMAN, K. N84-13740
CHAPMAN, R. D. N84-14072
CHAPMAN, R. E. N84-13395
CHAPMAN, R. S. N84-13505
CHARGIN, A. K. N84-13995
CHARLOT, L. A. N84-13304
CHEN, L. N84-14027
CHEN, P. F. S. N84-13391
CHEN, S. B. N84-13335
CHENG, E. T. N84-14014
CHERDACK, R. N. N84-14019
CHEW, H. W. N84-13937
CHIAN, C. T. N84-13412
CHIANG, S. N84-13973
CHIEN, C. H. N84-13389
CHINZEI, N. N84-13213
CHISHOLM, W. L., JR. N84-13933
CHIU, W. N84-13590
CHOI, D. W. N84-13148
CHOI, I. N84-13221
N84-13222
CHOI, M. N84-13298
CHOI, M. H. N84-13299
CHONG, Y. P. N84-13947
CHOPRA, O. K. N84-13292
N84-13295
CHOU, T. W. N84-13226
CHRISTIANSON, C. C. N84-13472
CHRISTOPHOROU, L. G. N84-14017
CLARK, I. O. N84-13211
CLARK, R. D. N84-13760
CLAUS, J. N84-14050
CLAUS, R. W. N84-13188
CLAYTOR, T. M. N84-13929
CLEMENTS, J. S. N84-13681
CLEMENTS, P. A. N84-13411
CLIFFORD, J. E. N84-13473
CLINARD, F. W., JR. N84-13329
CLINE, S. N84-13193
CLOUGH, S. A. N84-13712
CLOUTIER, J. R. N84-13899
COACHMAN, L. K. N84-13753
COHEN-TENOUDJI, F. N84-13620
COHEN, J. B. N84-13897
N84-14041
COLE, A. G. N84-13947
COLLAROS, G. J. N84-13675
COLLINS, M. W. N84-13863
COLWELL, R. N. N84-13634
COMPTON, R. T., JR. N84-13427
CONNOLLY, D. J. N84-13399
CONNOLLY, P. L. N84-13476
CONSIGNY, H. N84-13145
CONSOLMAGNO, G. N84-14096
COOK, R. D. N84-13732
COOKE, J. F. N84-14045
COOPER, A. L. N84-13585
COOPER, W. A. N84-14001
COOPER, W. S. N84-13948
COPPENS, A. B. N84-13925
CORBIT, C. D. N84-13542
CORDERMAN, R. R. N84-14058
CORLEY, J. P. N84-13542
CORNACCHIA, M. N84-14050
CORNISH, D. N. N84-13918
CORRELL, D. L. N84-14015
COTTART, J. J. N84-13503
COTTON, R. V. N84-13431
N84-13432
COULTER, R. L. N84-13717
N84-13718
COUNCE, R. M. N84-13521
COURANT, E. D. N84-14050
COWLEY, P. J. N84-14069
CRABTREE, G. W. N84-14054
CREAR, D. A. N84-13651
CREEDON, R. L. N84-14014
CROCKER, M. D. N84-13861
CROSS, L. E. N84-13461
N84-14043
CROUCH, R. K. N84-13211
CROW, J. T. N84-14029
CROWE, R. A. N84-13415
CRUICKSHANK, J. M. N84-13552
CRUZ, M. A. C. N84-13446
CURTISS, M. B. N84-13890
CUSHNIE, J. N84-13627
CUTTS, D. N84-13476
CYRUS, W. L. N84-13290
CZANDERNA, A. W. N84-13676

D

DABIRI, A. E. N84-14019
DAI, Y. W. N84-13189
DAMM, C. C. N84-14009
DANFORD, M. D. N84-13263
DANIEL, D. C. N84-13215
DAVID, S. A. N84-13286
DAVIDS, C. N. N84-13554
DAVIS, H. P. N84-13940
DAYAN, M. N84-13577
DEBEER, E. J. H. N84-13814
DEBNAM, W. J. N84-13211
DEBONI, T. M. N84-14047
DELAAT, J. C. N84-13140
DELMISTRO, R. F. N84-13814
DENIG, W. F. N84-13210
DENNIS, B. N84-14098
DERBRIDGE, C. N84-13587
DERIS, J. N84-13370
DESPAIN, R. N84-13317
DETCH, J. L. N84-13439
DETERMAN, W. R. N84-13984
DEUTSCH, L. J. N84-13403
N84-13406
DEVAN, J. H. N84-13293
DEVANCE, D. C. N84-13443
DEVANEY, M. J. N84-13863
DEWAAL, D. J. N84-13904
N84-13905
DEWEY, K. F. N84-13745
DICKINSON, J. T. N84-13314
DIJAK, J. T. N84-13452
DIMICELI, E. V. N84-13194
DINGUIRARD, M. N84-13637
DIPPOLITO, D. A. N84-13999
N84-14007
DIPRIMA, R. C. N84-13492
DIXON, D. A. N84-13237
DOBES, I. N84-13843
DOBROTT, D. N84-14019
DOBSON, M. C. N84-13635
DODDAPANENI, N. N84-13458
DODGE, R. R. N84-13774
DOHERTY, M. N84-13770
DOLEV, D. N84-13820
DOMALAVAGE, P. N84-13276
DONAHUE, M. J. N84-13153
DONNELLY, M. I. N84-13764
DORIAN, P. B. N84-13740
DORY, R. A. N84-14008
DOTY, W. R. N84-13681
DOVICHI, N. J. N84-13572
DOWGIALLO, E. J., JR. N84-14072
DOWNEY, A. N. N84-13399
DOWNEY, R. M. N84-13809
DOYLE, B. L. N84-14033
DOYLE, W. S. N84-13880
DREISBACH, R. L. N84-13153
DRESHFIELD, R. L. N84-13264
DREWS, M. J. N84-13343
DROTNING, W. D. N84-13328
DRUMM, A. C. N84-13181
DUBEAU, R. W. N84-13201
DUCKHORN, S. L. N84-13697
DUFFY, C. J. N84-14097
DUFFY, J. M. N84-13865
DUFFY, M. O. N84-13895
DUNLAP, J. L. N84-14001

E

EASTERLY, J. L. N84-13744
EATON, L. R. N84-13732
EBERTSOHN, M. R. N84-13776
EDER, D. C. N84-14086
EDMONDS, P. H. N84-14001
EDWARDS, T. C. N84-13574
EGOROV, V. F. N84-13575
EINSTEIN, H. N84-13463
EKDAHL, C. A. N84-13954
EL-DEBAILO, S. M. N84-13702
EL-HENAWY, I. M. N84-13487
EL-ZOHNY, H. A. N84-13911
ELDRIDGE, O. C. N84-13434
N84-14001
ELDRIDGE, P. N84-13757
ELLINGSON, W. A. N84-13929
ELLIOTT, R. C. N84-13466
ELLIS, J. N84-13402
N84-13965
N84-13968
EMERSON, L. C. N84-14002
EMERY, M. H. N84-13556
N84-13565
EMMONS, H. W. N84-13369
EMORI, R. I. N84-13368
ENGER, R. C. N84-13537
ENGQUIST, M. G. N84-14020
ENGLAND, A. C. N84-14001
ENGLISH, J. D. N84-13529
ENSLIN, W. R. N84-13641
ERIKSON, E. D. N84-13247
ERIKSSON, L. E. N84-13155
ERMAK, D. L. N84-13689
ERWIN, J. N84-13332
ETTERS, R. D. N84-14057
EVANS, J. C., JR. N84-13944
EVANS, R. M. N84-13554
EYRE, D. N84-13873
EZRA, C. E. N84-13637

F

FAEHL, R. J. N84-13946
FAETH, G. M. N84-13187
FALKE, W. L. N84-13593
FANTER, D. L. N84-13318
FARMER, J. C. N84-13994
FARNUM, D. J. N84-14048
FARRELL, J. A. N84-13953
FATTI, L. P. N84-13877
FAULKNER, M. G. N84-13695
FAWLEY, W. M. N84-13557
FECHNER, W. N84-13570
FEE, D. C. N84-13469
FEHLMANN, R. N84-13801
FEIGELSON, R. S. N84-13988
FEIGENBAUM, H. N84-13672
N84-13673
FELDMAN, J. A. N84-13825
FELT, D. G. N84-13667
FELVER, T. N84-13339
FENDELL, J. N84-13238
FENIMORE, E. E. N84-14105
FERRAN, J. N84-13448
FERREIRA, N. P. N84-13233
FERRIS, A. T. N84-13162
FESSENDEN, T. J. N84-13947
FIELDS, D. E. N84-13907
N84-13909
FIFE, P. C. N84-13255
FILIPPOVA, I. A. N84-13260
FINN, M. A. N84-13554
FISCHER, M. J. N84-13823
FISCHER, R. D. N84-13513
FISCHER, S. K. N84-13519
FISCINA, C. N84-13227
FISH, R. H. N84-13248
FISHBACH, L. H. N84-13812

FISHER, P. W. N84-13296
FISHER, R. M. N84-13540
FISK, G. A. N84-13563
FITZNER, R. E. N84-13762
FLEMING, P. N84-13380
FLINT, B. K. N84-14025
FLOCK, W. L. N84-13397
FOK, Y. S. N84-13394
FOLEY, R. T. N84-13269
FORBES, G. S. N84-13740
FORD, W. F. N84-13885
FORTENBACH, C. D. N84-13194
FOWLER, L. N84-13408
FRAIR, L. N84-13688
FRANCIS, G. L. N84-14007
FRANCO, P. J. N84-13692
FRANK, N. T. N84-13160
FRAUENHOLZ, R. B. N84-13402
FRAZIER, B. A. N84-13247
FRENCH, D. H. N84-13817
FRENCH, R. H. N84-13649
FRIEDMAN, R. N84-13346
N84-13370
FRIPP, A. L. N84-13211
FRITTS, M. J. N84-13556
FROST, W. N84-13730
FUISAWA, Y. N84-13611
FUJII, K. N84-13886
FUJITA, Y. N84-13602
FULGHAM, D. D. N84-13773
FUNK, S. D. N84-13546

G

GABRIEL, J. R. N84-13841
GAFNER, M. N84-13192
GAFNI, E. M. N84-13423
GALLAGHER, J. S. N84-13256
GALLARDO, V. C. N84-13193
GALLERY, W. O. N84-13712
GALPIN, J. S. N84-13903
GAMACHE, J. F. N84-13727
GARDNER, G. H., III N84-13504
GARDNER, J. H. N84-13556
N84-13565
GARDNER, W. L. N84-14001
GARISCH, I. N84-13882
GARRETT, G. G. N84-13266
GARTLING, D. K. N84-13323
N84-13522
GARWIN, E. L. N84-14055
GATHMAN, S. G. N84-13986
GATSKI, T. B. N84-13493
N84-13500
GAUGH, C. E. N84-13443
GAVRILIN, I. V. N84-13262
GAYLER, J. E. N84-13631
GEE, H. K. N84-13394
GEFWERT, C. N84-13919
GELBWACHS, J. A. N84-13243
GERBER, R. A. N84-14010
GERICH, C. N84-13967
GERICKE, O. R. N84-13926
GERRY, E. T. N84-13945
GERSHFELD, D. A. N84-13927
GHONIEM, A. F. N84-13189
GHOSN, L. N84-13607
GIBBARD, B. G. N84-13476
GIBSON, D. N84-13653
GIDDINGS, J. M. N84-13692
GIERSZEWSKI, P. J. N84-14034
GIESKE, J. H. N84-13597
GIESY, J. P. N84-13698
GILL, G. L., JR. N84-13207
GILMARTIN, T. J. N84-13553
GIRARDEAU, M. D. N84-13894
GIROUX, E. D. N84-13810
GLADSTONE, G. R. N84-14095
GLANCY, J. E. N84-14019
GLASER, R. E. N84-13230
GLAUERT, J. N84-13843
GLEESON, A. M. N84-14093
GLENNY, D. E. N84-13191
GODSTON, J. N84-13186
GOGGIN, R. N84-13676
GOH, C. J. N84-13603
GOLDFRANK, B. N84-13459
GOLDSTEIN, S. A. N84-13470
N84-13483
GOLE, J. L. N84-13242
GOMBERG, A. N84-13344
GOMEZ, J. N84-13815
GONCALVES, A. M. P. N84-14059
GOODELL, P. D. N84-13288
GOODMAN, M. M. N84-13759
GOODWIN, J. H. N84-13725
GOODYKOONTZ, J. H. N84-13924
GORDON, L. H. N84-13670
GRABER, K. A. N84-13508
GRADY, D. E. N84-13714
GRAHAM, D. R. N84-14070
GRANLUND, S. N84-13794
GRANT, N. J. N84-13276
N84-13281
N84-13282
N84-13283
N84-13618
GRAY, R. J. N84-13286
GRAYSON, M. A. N84-13318
GREBENIK, V. M. N84-13594
GREEN, M. A. N84-13467
N84-14049
GREEN, P. H. N84-14045
GREENLEES, G. W. N84-13554
GREENSPAN, M. E. N84-13700
GREENWALD, M. N84-14018
GREENWOOD, L. R. N84-14011
N84-14035
GRESHO, P. M. N84-13512
GRICE, J. V. N84-13545
GRIESS, J. C. N84-13286
GRIFFIN, T. B. N84-13881
GRIGOREV, V. P. N84-13259
GRIMES, P. N84-13463
GRIMSDITCH, M. N84-14053
GRIT, D. N84-13843
GRONER, N. E. N84-13363
GRONSKY, R. N84-13540
GROSCH, C. E. N84-13493
GROSS, S. N84-13671
GROSSBECK, M. L. N84-13294
GROTHUS, M. A. N84-13541
GROVEMAN, B. S. N84-13744
GRUEN, D. M. N84-13567
GUEDRY, F. E., JR. N84-13183
GUICHETEAU, P. N84-13144
GUPTA, S. N84-13869
GURNEY, C. M. N84-13630
GUROL, H. N84-14019
GUTIERREZ, M. N84-13676

H

HAAR, L. N84-13256
HAARIO, H. N84-13789
HAAS, G. M. N84-13434
HAGAN, W. K. N84-14019
HAGENLOCHER, A. K. N84-14025
HAHN, S. N84-13274
HAILEY, C. J. N84-14079
HAITOVSKY, Y. N84-13875
HALBLEIB, J. A. N84-13977
HALL, D. W. N84-13194
HALL, G. W. N84-13177
HALL, P. N84-13492
HALL, W. G. N84-13395
HALSTEAD, T. W. N84-13206
HAMMOND, R. H. N84-13405
HAMPEL, V. E. N84-14067
HAND, B. N84-13388
HANSEN, A. D. A. N84-13538
HANSON, A. L. N84-13300
HARDEKOPF, R. A. N84-13936
HARDY, G. H. N84-13198
HARDY, J. N84-13627
HARDY, J. R. N84-13631
N84-14047
HARDY, J. T. N84-13752
HARKER, A. H. N84-14052
HARLING, O. K. N84-13276
N84-13281
N84-13282
N84-13283
N84-13618
HARRACH, R. J. N84-13566
HARRIS, L. E. N84-13238
HARRISON, A. N84-13627
HART, C. F. N84-13894
HARTMAN, F. C. N84-13764
HARTY, R. B. N84-13984
HARVEY, B. R. N84-13416
HASEGAWA, H. N84-13602
HASEGAWA, R. N84-13298
HASELTON, N. H. N84-13434
HASEMI, Y. N84-13353
N84-13366
N84-13367
HASKELL, K. H. N84-13846
HASTINGS, D. E. N84-14000
HAUGEN, G. N84-13990
N84-13991
HAUPT, R. L. N84-13424
HAWKINS, D. M. N84-13903
HAYES, G. H. N84-13298
N84-13299
HAYES, N. V. N84-13413
HAYES, P. C., JR. N84-13336
HAYNES, T. H., JR. N84-13912
HAZELTINE, R. D. N84-14021
N84-14024
HAZI, A. U. N84-13972
HEALD, S. M. N84-13298
N84-13299
HEATH, W. S. N84-13181
HEBRON, D. E. N84-13939
HEDEMANN, M. A. N84-13465
HEDLUND, E. R. N84-13227
HEDRICK, C. L. N84-14000
HEDSTROM, J. C. N84-13516
HEILSTEDT, M. R. N84-13832
HEIM, R., JR. N84-13745
HEINEMANN, H. N84-13248
HEMSCH, M. J. N84-13166
HENAGER, C. H. N84-13303
HENDRICKS, C. D. N84-13958
HENRY, R. C. N84-14074
HENSLEY, W. K. N84-13944
HERBST, M. J. N84-13556
HERLEVICH, A. N84-13758
HERMANN, W. N84-13840
HERRERA, J. N84-13682
HERRMANN, F. T. N84-13756
HERRMANNSFELDT, W. B. N84-14016
HERTZ, P. L. N84-14102
HERZEGH, P. H. N84-13728
HESTER, R. D. N84-13324
HESTER, R. E. N84-13947
HICKMAN, R. B. N84-13918
HICKOX, C. E. N84-13323
HICKS, H. R. N84-14008
HIEFTJE, G. N84-13990
HIEN, L. K. N84-13683
HIGDON, A. A., JR. N84-13179
HIGGINS, R. H. N84-13263
HILL, J. R. N84-13436
N84-13865
HILLS, R. G. N84-13541
HIND, G. N84-13760
HINDS, W. T. N84-13763
HINES, W. A. N84-13298
N84-13299
HINKS, D. G. N84-14054
HIRANO, T. N84-13373
HIRSCHFELD, T. N84-13990
N84-13991
HITCHCOCK, D. A. N84-14022
HO, Y. C. N84-14065
HOARD, R. W. N84-13918
HOBBIE, J. E. N84-13652
HOBBS, L. W. N84-13329
HOEEL, R. N84-13320
HOFFMAN, J. M. N84-14010
HOGAN, J. N84-13590
HOGAN, J. T. N84-14001
HOHENSEE, P. N84-13843
HOLBERG, C. J. N84-13774
HOLLOWAY, W. A. N84-13460
HOLM-KENNEDY, J. W. N84-13453
N84-13454
N84-13456
N84-14042
HOLM, R. G. N84-13637
HOLMES, J. A. N84-14008
HOLMES, N. C. N84-13287
HOLMES, R. B. N34-13422
HOLROYD, S. G. N84-13805
HOLT, B. D. N84-13690
HOLT, S. S. N84-14082
HOOVER, D. L. N84-13716
HOPKINS, G. R. N84-14014
HOPPER, A. T. N84-13265
HORIUCHI, S. N84-13351
HORNE, K. D. N84-14080
HORNSTRA, F. N84-13472
HORTON, E. H. N84-13719
HORTON, J. A. N84-13306
HORVATH, D. N84-13974
HOSKINS, J. K. N84-13914
HOUCHINS, J. P. N84-13760
HOUCK, C. W. N84-13286
HOUGHTON, R. A. N84-13652
HOWARD, W. M. N84-13566
HOWDEN, M. G. N84-13236
HOWELL, G. C. N84-13880
HOWETT, G. L. N84-13782
HSU, D. K. N84-13928
HU, Y. N84-13250

HUANG, C. C. N84-14046
HUANG, C. Y. N84-13330
HUBICKYJ, E. O. N84-14081
HUDSON, C. L. N84-14073
HUDSON, C. M. N84-13576
HUDSON, W. D. N84-13641
HUFFMAN, D. J. N84-13434
HUFFMAN, J. K. N84-13160
HUMENIK, F. M. N84-13188
HUNT, R. D. N84-13933
HUNTER, D. N84-14064
HUNTER, S. R. N84-14017
HUNTLEY, W. R. N84-13533
HURLEY, G. F. N84-13329
HUS, S. L. N84-13321
HUSSEY, W. J. N84-13748
HUSTON, R. L. N84-13580
N84-13821
HYDE, R. A. N84-13219
HYLIN, C. N84-13984

I

IGIRI, G. C. N84-13701
IGOSHI, I. N84-13357
IGUCHI, Y. N84-13368
IMESON, D. N84-13281
N84-13282
N84-13283
INAL, O. T. N84-14048
INGENITO, F. N84-13927
INOUE, K. N84-13871
N84-13872
INOUE, R. N84-13573
INOUE, Y. N84-13200
INSKEEP, J. H. W., JR. N84-13808
IRBY, C. A. N84-13675
ISAACS, H. S. N84-13300
ISHIGAKI, H. N84-13495
ISHII, S. N84-13213
IVANOVSKII, L. E. N84-13260
IWANIEC, T. N84-13799
IZENMAN, A. J. N84-13906

J

JACKSON, M. N84-13627
JACKSON, M. J. N84-13631
JACKSON, P. L. N84-13419
JACKSON, R. D. N84-13637
JACKSON, W. B. N84-13680
JAEGER, E. F. N84-14000
JAMES, L. C. N84-13686
JANSKY, J. H. N84-13656
JARDIM, J. O. D. N84-14083
JARDIM, M. V. A. N84-14083
JAUNCEY, D. L. N84-13416
JENKINS, L. H. N84-14045
JENKINS, R. V. N84-13151
JETT, J. H. N84-13572
JEWELL, W. S. N84-13596
JIN, T. N84-13351
N84-13355
JIROMARU, H. N84-13345
JOHANSON, W. R. N84-13307
JOHNSON, D. J. N84-13939
N84-13951
N84-14010
JOHNSON, M. N84-13983
JOHNSON, M. B. N84-13942
JOHNSON, R. M. N84-13438
JOHNSON, R. W. N84-13420
N84-13896
JOHNSON, T. D., JR. N84-13160
JOHNSON, W. G., JR. N84-13162
JOHNSTON, W. A. N84-13149
JONES, H. D. N84-13179
JONES, L. L. N84-13545
JONES, M. E. N84-13950
N84-13956
N84-14003
JONES, P. L. N84-13817
JONES, R. D. N84-13560
JONES, R. H. N84-13289
N84-13291
N84-13302
N84-14026
JONES, R. M. N84-13726
N84-13931
JONES, T. L. N84-13653
JONES, W. H. N84-13559
JORGENSEN, G. N84-13676
JOYNT, R. J. N84-14036

K

KAHNEMAN, D. N84-13778
KAISER, J. A. C. N84-13645
N84-13646
KALMYKOVA, T. N. N84-13258
KAMEN, J. S. N84-13617
KAMIYA, Y. N84-13955
KAMMAN, J. W. N84-13580
N84-13821
KAMPAS, F. J. N84-14058
KANAKIS, G. D. N84-14060
KANE, R. H. N84-13288
KANSA, E. J. N84-13689
KANTNER, E. N84-13463
KAPLAN, D. P. N84-14070
KARCHER, E. A. N84-13185
KARLSSON, E. A. N84-13443
KARO, A. M. N84-14047
KASCAK, T. J. N84-13399
KASPER, R. G. N84-13895
KASTNER, C. J. N84-13637
KATOW, M. S. N84-13407
KATZ, J. N84-13404
KAUFMAN, A. N84-13672
N84-13673
KAUFMAN, S. L. N84-13554
KAUN, T. D. N84-13485
KAWAGOE, K. N84-13347
KAWAIN, R. A. N84-14067
KAYE, J. H. N84-13571
KAZA, K. R. V. N84-13610
KAZANAS, D. N84-14103
KEESEE, R. G. N84-13562
KELL, G. S. N84-13256
KELLER, R. A. N84-13572
KELPL, M. J. N84-13197
KENESHEA, T. J. N84-13713
KENIMER, R. L. N84-13781
KENNEY, W. L., JR. N84-13768
KERN, E. L. N84-13207
KERRISK, J. F. N84-13387
KERSH, T. B. N84-13429
KETONEN, T. N84-13800
KHAN, I. N84-13407
KHLYNOV, V. V. N84-13258
KHOE, T. K. N84-13941
KHORRAMI, M. R. N84-13507
KIM, K. N84-13958
KINDEL, J. M. N84-13560
KINDL, M. R. N84-13808
KING, F. K. N84-14055
KING, R. J. N84-13601
KING, R. W. P. N84-13418
KIRBY, R. E. N84-14055
KIRK, H. N84-13982
KIRKHAM, R. R. N84-13653
KIRKPATRICK, D. L. N84-13682
KIRKPATRICK, R. C. N84-14091
KISHI, H. N84-13465
KISHITANI, K. N84-13349
KISSEL, L. N84-13939
KISSEL, L. D. N84-13949
KLEBESADEL, R. W. N84-14105
KLEIN, D. E. N84-13523
KLEINHOLZ, A. F. N84-13509
KLUEH, R. L. N84-13285
N84-13294
KLUGER, J. W. N84-13579
KNAPP, F. F., JR. N84-13759
KNEFF, D. W. N84-14035
KNEIZYS, F. X. N84-13712
KOBASHI, K. N84-14057
KOCH, C. C. N84-13306
KOGAN, V. A. N84-13259
KOGAN, V. G. N84-13930
KOLAR, W. A. N84-13682
KOMURO, T. N84-13213
KONDO, H. N84-13154
KONECNY, R. N84-13962
KORNECKI, A. N84-13499
KORTH, G. E. N84-13273
KORTMAN, P. J. N84-13434
KOSHIDE, S. N84-13612
KOTERAS, J. R. N84-13622
KRAKOWSKI, R. A. N84-14031
KRAMER, S. L. N84-13962
KRANER, H. W. N84-13300
N84-14056
KRAUSE-POLSTORFF, J. W. N84-14085
KROLIK, J. H. N84-14082
KROOK, M. N84-13418
KRUG, A. C. N84-13202
KUBY, W. N84-13587
KUCHERENKO, S. S. N84-13259
KUDO, K. N84-13213
KUEHNAU, R. N84-13804
KUFELD, R. M. N84-13176
KUKHTIN, M. V. N84-13258
KUMAR, R. N84-13690
KURTZ, S. E. N84-13907
N84-13909
KUSTOM, R. L. N84-13941
KUZNETSOV, V. V. N84-13259
KWAN, T. J. T. N84-13433
N84-13440

L

LABELLE, S. J. N84-13693
N84-14073
LACOVARA, P. N84-13564
LAFORAGARCIA, F. N84-13811
LAINE, S. N84-13175
LAKDAWALA, V. K. N84-14017
LAMB, B. M. N84-13998
LAMB, J. P. N84-13523
LAMBARSKI, T. J. N84-13675
LAMBRECHT, R. M. N84-13974
LAMERSDORF, W. N84-13856
LANDRUM, P. F. N84-13698
LANE, D. M. N84-13779
LANE, S. M. N84-13543
LANGE, M. A. N84-13704
LANN, N. A. N84-14067
LAROCHELLE, V. N84-13552
LAROS, J. G. N84-14105
LARSON, K. R., JR. N84-13271
LAUER, E. J. N84-13947
LAVERNIA, E. N84-13276
LAVERTY, N. P. N84-13732
LEAF, G. K. N84-13527
LEBER, R. L. N84-13918
LEBOW, P. S. N84-13708
LEBOWITZ, M. D. N84-13774
LEE, E. H. N84-13275
LEE, E. K. C. N84-13971
LEE, G. H., II N84-13337
LEE, H. N84-13950
N84-13956
N84-14003
LEE, J. D. N84-13918
LEE, J. N. N84-13430
LEE, J. R. N84-13939
N84-13977
LEE, M. N84-13283
N84-13618
LEE, R. L. N84-13512
LEE, S. S. N84-13621
LEE, T. S. N84-13472
LEE, T. S. H. N84-13959
LEEPER, R. J. N84-13939
N84-13951
LEHTO, O. N84-13783
LEIGHTON, F. T. N84-13450
N84-13820
LEIS, B. N. N84-13265
LEISERSON, C. E. N84-13450
LEMASTER, E. W. N84-13642
LEMONS, D. S. N84-13950
N84-14003
LEONARD, V. D. N84-14107
LEPPER, J. K. N84-13228
LESKOVAR, B. N84-13468
N84-13475
LESLIE, D. H. N84-13708
LESNY, D. N84-13437
N84-13837
LEVENSON, J. B. N84-13864
LEVERSEE, G. J. N84-13698
LEVIN, B. M. N84-13363
LEVINSKIENE, A. M. N84-13267
LEVY, A. J. N84-13568
LEWIS, D. A. N84-13554
LEWIS, D. W. N84-14101
LEWIS, J. A. N84-13179
LEYENDECKER, E. V. N84-13390
LI, X. N84-13321
LIANG, E. P. N84-14104
LIJEWSKI, L. E. N84-13215
LILLIE, A. F. N84-13979
LIN, M. C. N84-13730
LIN, S. C. N84-13430
LINDQVIST, P. N84-13794
LINLOR, W. I. N84-13985
LIPKIN, H. J. N84-13964
LITTLEFIELD, R. J. N84-13836
LIU, C. T. N84-13306
LIU, D. C. N84-13399
LIU, K. C. N84-13305

LO, C. C. N84-13468
N84-13475
LOBERG, G. N84-13828
LOCKRIDGE, P. A. N84-13674
LONDON, R. A. N84-14106
LONG, L. N. N84-13923
LORENA, L. A. N. N84-13883
LORING, C. M., JR. N84-13305
LOSARCOS, J. M. N84-13915
LOTTES, W. D. N84-13740
LU, P. H. N84-13321
LUKENS, R. W. N84-13615
LUPSON, W. F. N84-13578
LUSCH, D. P. N84-13641
LUSK, E. L. N84-14066
LUUS, H. G. N84-13904
N84-13905
LYNCH, N. A. N84-13823
N84-13891

M

MA, S. S. L. N84-13932
MACHLES, G. W. N84-13218
MACMURRAY, A. C. N84-14107
MAEDA, Y. N84-13476
MAEST, A. S. N84-13651
MAGGIORE, C. J. N84-14097
MAHAJAN, S. M. N84-14022
MAHASUVERACHAI, M. N84-13623
MAKO, F. N84-13946
MALACHESKY, P. N84-13463
MALEK, D. N84-13374
MALIK, J. N84-13439
MANI, S. A. N84-13945
MANKIEWICZ-CUDNY, E. N84-14037
MANN, F. M. N84-14035
MANN, J. Y. N84-13578
MANRO, M. E. N84-13153
MANSUR, L. K. N84-13275
MANTHEY, M. J. N84-13919
MANTSCH, P. N84-13983
MAO, N. H. N84-13625
MARGRAVE, G. N84-14066
MARKHAM, D. G. N84-13751
MARQUIS, J. A. N84-13586
MARSHALL, B. W. N84-13541
MARSHALL, L. S. N84-13678
MARTEMYANOVA, Z. S. N84-13260
MARTIKAINEN, O. N84-13803
MARTIN, C. A. N84-13174
MARTIN, I. M. N84-14083
MARTIN, J. C. N84-13572
MARTIN, T. J. N84-13717
N84-13718
MARTIN, W. N. N84-13389
MARTIO, O. N84-13794
MASON, J. D. N84-13844
MASTERSON, K. D. N84-13676
MASUYA, G. N84-13213
MATHERS, C. D. N84-13396
MATSUSUE, K. N84-13611
MATTILA, P. N84-13791
MAUTNER, T. S. N84-13488
MAYA, I. N84-14014
MAYNE, D. N84-13374
MAZARAKIS, M. G. N84-13954
MCBRIDE, J. B. N84-14019
MCCALL, G. H. N84-13555
MCCORMICK, C. L. N84-13324
MCDONALD, J. A. N84-13697
MCDONALD, J. R. N84-13695
MCFADDEN, J. N84-13676
MCGOWAN, J. R. N84-13199
MCGRAW, J. N84-13843
MCGROGAN, S. K. N84-14067
MCGUIGAN, D. L. N84-13865
MCINTURFF, A. N84-13983
MCKANNAN, E. C. N84-13205
MCKINLEY, W. G. N84-13428
MCKNIGHT, R. C. N84-13173
MCNEIL, J. A. N84-13408
MCNULTY, P. J. N84-13937
MCQUEEN, S. V. N84-13686
MCWITHEY, R. R. N84-13614
MEANS, J. L. N84-13651
MEGER, R. A. N84-13483
MEGUSAR, J. N84-13276
N84-13282
MEIER, T. N84-13558
MELILLO, J. M. N84-13652
MENDEL, C. W., JR. N84-14029
MENDELSON, A. N84-13607
MENDONCA, F. J. N84-13640
MERLINO, R. L. N84-13996
MERRILL, R. K. N84-13177
MERRILL, W. C. N84-13140
MERRITT, B. T. N84-13471
N84-14028
MERTI, F. E. N84-13313
MESSIER, D. R. N84-13196
MEYER, A. H. N84-13389
MEYER, B. N84-13388
MIHALKA, A. M. N84-13471
N84-13569
MIKHALEV, V. N84-13216
MIKKELSEN, K. L. N84-13173
MIKULAS, M. M., JR. N84-13608
MILANOVICH, F. N84-13991
MILES, R. B. N84-13212
MILEY, G. H. N84-14006
MILLER, J. A. N84-13581
MILLER, J. F. N84-13472
MILLER, J. M. N84-13392
MILLER, L. G. N84-13277
MILLER, L. L. N84-13237
MILLER, P. A. N84-14010
N84-14012
N84-14029
MILLER, R. B. N84-13954
MILLER, V. R. N84-13593
MILLER, W. C. N84-13755
MILLS-CURRAN, W. C. N84-13605
MINAMI, H. N84-13373
MINDER, T. L. N84-14063
MINES, G. L. N84-13531
MIODUSZEWSKI, P. K. N84-14002
MITCHELL, A. C. N84-13287
MITCHELL, J. L. N84-13749
MITCHELL, K. J. N84-14076
MITRONOVAS, W. N84-13659
MIX, L. P. N84-14029
MOATS, R. N84-13893
MOEZZI, S. N84-13635
MOFFAT, A. N84-13679
MOHR, P. B. N84-13589
MOIR, R. W. N84-13277
MOND, B. N84-13874
MOOK, H. A. N84-14054
MOON, R. M. N84-14045
MOORE, B. N84-13652
MOORE, S. W. N84-13681
MOORE, T. L. N84-13995
MORABITO, D. N84-13416
MORALES, G. J. N84-13998
MORETTO, L. G. N84-13943
MORGAN, W. C. N84-13325
MORIKAWA, T. N84-13377
MORISHITA, Y. N84-13347
MORO, J. N84-13209
MORRISON, P. J. N84-14021
MOSADDAD, B. N84-13308
MOSS, M. N84-13515
MOSTROM, M. A. N84-13440
MOYNIHAN, T. M. N84-13529
MUELLER, R. O. N84-13466
MULHOLLAND, G. P. N84-13541
MULLER, R. H. N84-13994
MUNCH, R. A. N84-13645
N84-13646
MUNGAL, M. G. N84-13489
MURABAYASHI, E. T. N84-13394
MURAKAMI, A. N84-13213
MURPHY, K. P. N84-13526
MURRAY, G. J. N84-13910
MURRAY, J. N. N84-13484
MURRELL, M. T. N84-14097
MURTAGH, M. J. N84-13476
MURTAGH, S. J. N84-13476
MUSHOTZKY, R. F. N84-14082
MUSKET, R. G. N84-13279
MYRA, J. R. N84-13999
N84-14007

N

NAEAETAENEN, M. N84-13798
NAGASAKI, M. N84-13612
NAKAMURA, T. N84-13871
NAKAYA, I. N84-13364
NAPPO, C. J. N84-13743
NARULA, A. N84-13321
NASH, R. W. N84-13547
NATHAL, M. W. N84-13264
NATZLE, W. C. N84-13251
NAVON, I. M. N84-13878
NEASE, A. B. N84-13231
NEELY, G. M. N84-13188
NEEMAN, Y. N84-13913
NEGRI, A. J. N84-13735
NEIDLINGER, H. H. N84-13324
NEIL, V. K. N84-13947
NEL, D. G. N84-13904
NELLIS, W. J. N84-13287
NELSON, G. C. N84-13239
NELSON, H. E. N84-13348
N84-13360
N84-13361
N84-13363
NEMETH, T. M. N84-13311
NEMOTO, M. N84-13268
NEORI, A. N84-13757
NEPOMUCENO, L. X. N84-13595
NETO, G. C. N84-13640
NEWBY, K. N84-13463
NEWMAN, B. K. N84-13592
NEWNHAM, R. E. N84-13461
N84-14043
NGAI, K. L. N84-13330
NICHOLS, B. N84-13255
NICOLAENKO, B. N84-13901
NICOLET, M. A. N84-14038
NIELL, A. N84-13416
NIELSEN, J. N. N84-13166
NIETO, M. M. N84-13203
NISHIMARU, Y. N84-13376
NIVEN, H. N84-13587
NOMOTO, T. N84-13602
NORWOOD, V. N84-13731
NOVAK, K. M. N84-13693
NOVAKOV, T. N84-13538
NOVO, E. M. L. M. N84-13639
NOYAN, I. C. N84-13897
N84-14041
NOYES, H. P. N84-13919
NUNIATO, J. W. N84-13323
NUSSBAUM, M. N84-13686
NYBERG, K. N84-13800

O

ODETTE, G. R. N84-13301
OH, S. H. N84-13921
OKADA, D. N84-13453
N84-13456
OLDEHOEFT, R. N84-13843
OLSON, K. A. N84-13817
OMURA, J. K. N84-13406
ONO, K. N84-13317
ONTKO, N. R. N84-13272
OPPENHEIM, A. K. N84-13189
ORGANIC, V. J. N84-13185
ORLANDO, V. A. N84-13171
OSIECKI, R. A. N84-13685
OSIPOV, O. A. N84-13259
OSKAM, H. J. N84-13997
OSULLIVAN, T. C. N84-13604
OTTINGER, P. F. N84-13483
OTTO, D. A. N84-13775
OVERBEEK, R. A. N84-14066
OVERTON, W. C., JR. N84-14051
OWENS, M. N84-13418

P

PAABO, M. N84-13374
PACE, P. N84-13552
PACK, D. H. N84-13743
PADILHA, A. L. N84-13707
PAGNI, P. J. N84-13371
PALMER, F. T. N84-13887
PALMER, J. M. N84-13637
N84-13638
PARADA, N. D. J. N84-13632
N84-13639
N84-13640
PARASIE, Y. N84-13447
PARK, A. B. N84-13652
PARKER, C. A. N84-13281
PARKER, L. E. N84-13719
PARKS, R. W. N84-13194
PARZEN, E. N84-13900
PARZEN, G. N84-14050
PASTOREK, R. A. N84-13481
PASTUKHOV, B. A. N84-13258
PATEL, N. N84-13491
PATERSON, M. S. N84-13823
PATTERSON, S. R. N84-13993
PAULS, J. I. N84-13362
PAULSON, J. W., JR. N84-13163
PEASE, D. M. N84-13298
N84-13299
PELLEGRINI, C. N84-13969
PELLIN, M. J. N84-13567

PENCE, T. J. N84-13616
PENDERGRAFT, O. C., JR. N84-13165
PEPPER, D. W. N84-13517
PERATT, A. L. N84-13440
PERKINS, P. J., JR. N84-13173
PERRY, A. M. N84-13723
PERRY, K. N84-13897
PERRY, M. L. N84-13862
PERTSEKAS, D. P. N84-13423
PETENEV, O. S. N84-13260
PETER, W. N84-13946
PETERSEN, H. N84-13467
N84-14049
PETERSON, B. J. N84-13652
PETRE, R. N84-14082
PETRO, J. N84-13888
PETTY, S. M. N84-13405
PFEFFER, R. N84-13532
PHILLIPS, B. A. N84-13526
PHILLIPS, D. R. N84-13663
PHIPPS, J. K. N84-13331
PICKLES, T. R. N84-13833
PIEPER, S. C. N84-13220
PIER, J. R. N84-14077
PIERCE, R. D. N84-13480
PINET, A. N84-13447
PING, C. N84-13388
PINNINGTON, R. J. N84-13613
PINTO, R. L. U. D. N84-13884
PLACEK, T. D. N84-13257
PLATZNER, I. N84-13237
PLEASANT, L. G. N84-13206
PODWYSOCKI, M. N84-13643
POENITZ, W. P. N84-13970
POLANSKY, G. F. N84-13523
POLLACK, J. B. N84-14096
POMMERENKE, C. N84-13795
PONTE, N. S. N84-13434
POOLE, J. W. N84-13167
POON, C. W. N84-13732
POOR, H. V. N84-14108
PORCAR, J. B. N84-13860
PORTER, J. N84-13384
POSNER, E. C. N84-13401
POSTOLNIK, Y. S. N84-13606
POTMESIL, M. N84-13824
POTTER, G. L. N84-13722
POTTER, J. M. N84-13478
POUKEY, J. W. N84-13954
POWELL, G. H. N84-13308
N84-13391
N84-13623
POWERS, E. L. N84-13765
POWERS, L. N84-14032
PRADO, K. L. N84-13934
PRAUSNITZ, J. M. N84-13250
N84-13315
PREIS, H. N84-14023
PRESCOTT, C. Y. N84-13976
PRESTON, R. N84-13416
PRICE, J. C. N84-13628
PRINCE, J. M. N84-13325
PRINGLE, O. A. N84-14054
PRODELL, A. N84-13982
PROSNITZ, D. N84-13557
PROTHEROE, R. J. N84-14103
PROVOST, C. E. N84-13626
PURMONEN, V. T. N84-13797
PUTNAM, L. E. N84-13161
PYPER, J. W. N84-13339

Q

QUENTIN, G. N84-13620
QUINN, G. D. N84-13196
QUINTENZ, J. P. N84-14010
N84-14029
QUINTIERE, J. N84-13354
N84-13372
QUINTO, P. F. N84-13163
QUIRK, J. F. N84-13479

R

RABINOWITZ, P. N84-13876
RAE, W. J. N84-13591
RAFFENETTI, R. C. N84-13838
RAGO, C. E. N84-13467
N84-14049
RAJA, R. N84-13983
RAJAGOPAL, A. K. N84-13330
RAJAN, J. B. N84-13472
RAJESWARAN, G. N84-14058
RAMAKRISHNAN, V. N84-13764
RAMIREZ, J. J. N84-13954
RAMSEY, J. W., JR. N84-13576
RANAUDO, R. J. N84-13173
RATHJEN, K. A. N84-13501
RAZZAQ, Z. N84-13608
REDA, D. C. N84-13522
REED, I. S. N84-13406
REEVES, J. H. N84-13944
REID, W. J. N84-13987
REIFENBERGER, R. N84-13966
REILLY, H. F., JR. N84-13410
REILLY, J. P. N84-13465
RESNIK, W. M. N84-13675
REVILL, G. W. N84-13578
REYNOLDS, J. W. N84-13933
RHODERICK, J. E. N84-13654
RICE, C. K. N84-13519
RICHARD, R. N84-13587
RICHARDS, L. W. N84-13697
RICHARDS, P. L. N84-13973
RICHARDSON, J. A. N84-13181
RICHARDSON, W. E. N84-13818
RICHARDSON, W. L. N84-13699
RICKMAN, S. N84-13793
RIEBE, G. D. N84-13164
RINTA, R. I. N84-13467
N84-14049
RIOS, M. T. B. N84-13813
ROBERTO, J. B. N84-14004
ROBERTS, M. M. N84-13227
ROBLEE, J. W. N84-13993
RODEAN, H. C. N84-13689
ROEHL, E. N84-13388
ROGACKI, J. R. N84-13584
ROGERS, P. S. Z. N84-14097
ROHR, D. L. N84-13329
ROMERO, L. N84-13816
ROOSE, L. D. N84-13939
ROSE, J. H. N84-13598
N84-13928
N84-13930
ROSE, M. E. N84-13609
ROSEN, H. N84-13538
ROSENBLUTH, M. N. N84-14020
ROSENTHAL, S. E. N84-14029
ROSINGER, E. E. N84-13874
ROSS, P. N. N84-13245
ROSS, S. M. N84-13898
ROTH, E. P. N84-13297
ROTH, F. T. N84-13635
ROUTE, R. K. N84-13988
ROWAN, L. N84-13643
ROWCLIFFE, A. F. N84-13275
ROWE, M. D. N84-13693
ROWLEY, R. L. N84-13524
ROY, D. N84-13447
ROY, G. N84-13711
RUBINCAM, D. P. N84-13705
RUDNIK, P. J. N84-13897
RUGGERI, R. T. N84-13249
RUNGTA, R. N84-13265
RUSSELL, R. J. N84-13544
RUTLEDGE, S. A. N84-13729
RUTSCH, A. H. N84-13750
RUYS, J. P. N84-13644
RYALL, T. G. N84-13879
RYLAND, G. N84-13534

S

SABERI, H. A. N84-13157
SABO, N. A. N84-13839
SADY, C. A. N84-13847
SAHNI, S. N84-13822
SAITO, F. N84-13349
N84-13375
N84-13378
SAITO, K. N84-13368
SAKA, P. M. N84-14042
SAKAI, J. N84-14099
SAKELL, L. N84-13510
SALISBURY, J. N84-13643
SALO, S. A. N84-13753
SANI, R. L. N84-13512
SANTAVICCA, D. A. N84-13212
SARGENT, J. P. N84-13320
SARICKS, C. L. N84-13693
SARIO, L. N84-13786
SARVAS, J. N84-13792
SATO, K. N84-13373
SATTI, J. A. N84-13386
SAUERMANN, H. B. N84-13498
SAVAGE, R. N84-13637
SAVESTRE, C. N84-13142
SAWYER, C. N84-13661
SAYERS, D. E. N84-13299
SCANLAN, R. M. N84-13918
SCHANTZ, R. E. N84-13827
SCHAPHORST, R. A. N84-13431
N84-13432
SCHARLACK, R. S. N84-13679
SCHARLEMANN, E. T. N84-13557
SCHECHNER, Z. N84-13898
SCHEURER, B. N84-13901
SCHIOLER, L. J. N84-13196
SCHIPPER, L. M. N84-13770
SCHLACHTER, J. S. N84-14013
SCHLAFKE, A. P. N84-13383
N84-13385
SCHMERR, L. W. N84-13599
SCHMUNK, R. E. N84-13273
SCHNEIER, J. S. N84-13644
SCHROEDER, H. N84-13278
SCHUBERT, J. F. N84-13715
SCHUESSLER, H. A. N84-13558
SCHULLER, I. K. N84-14053
SCHULTZ, K. R. N84-14014
SCHUMACHER, J. D. N84-13753
SCHUMACHER, M. A. N84-13319
SCHWANEKE, A. E. N84-13547
SCHWEITZER, D. L. N84-13819
SCHWINKENDORF, W. E. N84-13675
SCOGGINS, J. R. N84-13736
SCOTT, K. J. N84-13235
SCOTT, W. S. N84-14067
SEARLS, C. A. N84-13655
SEARS, M. P. N84-13840
SEIBEL-ROSS, E. I. N84-13754
SEIBERT, D. L. R. N84-13757
SEMIATIN, S. L. N84-13582
SENNE, E. L. F. N84-13813
SESSLER, A. M. N84-13961
SEVERYN, J. R. N84-13436
SEVESTRE, C. N84-13141
N84-13143
N84-13382
N84-13916
SHA, W. T. N84-13908
SHAGALOV, V. L. N84-13258
SHANAHAN, W. R. N84-14005
SHAO, H. M. N84-13406
SHAPIRO, A. B. N84-13835
N84-13849
SHAVER, G. R. N84-13652
SHEARER, D. M. N84-13232
SHEFFIELD, S. A. N84-13563
SHELTON, J. C. N84-13732
SHEN, H. M. N84-13418
SHEPHER, A. N84-13743
SHER, D. B. N84-13890
SHERMAN, F. S. N84-13189
SHERWOOD, R. J. N84-13848
SHESTAKOV, A. I. N84-13902
SHIN, M. S. N84-13989
SHIRLEY, J. W. N84-13686
SHOAEE, H. N84-13482
SHOPE, S. L. N84-13954
SHORE, J. N84-13896
SHORE, J. E. N84-13426
SHUEN, J. S. N84-13187
SIDI, A. N84-13885
SILBERGLITT, R. N84-13683
SIMANAVICHIUS, L. E. N84-13267
SIMONEN, E. P. N84-13303
N84-13304
SIMPKINS, J. E. N84-14002
SIMPSON, J. N84-13962
SINCLAIR, J. H. N84-13224
SINGH, M. K. N84-13693
SINHA, S. K. N84-14054
SISSON, C. E. N84-13515
SKEDZIELEWSKI, S. N84-13843
SKILLINGS, B. J. N84-13599
SKINNER, G. T. N84-13591
SKLAD, P. S. N84-13278
SKOWRONSKI, R. P. N84-14035
SKUMANICH, A. N84-13680
SLATER, P. N. N84-13637
N84-13638
SLIFKIN, L. N84-13536
N84-14039
SLUTZ, S. A. N84-13951
N84-14010
SMITH, D. A. N84-13885
SMITH, D. L. N84-13292
N84-13295
SMITH, D. W. N84-13398
SMITH, D. Y. N84-14052
SMITH, G. C. N84-13539
SMITH, G. V. N84-13521
SMITH, H. A. N84-13319

SMITH, J. F. N84-13621
SMITH, J. J. N84-13455
SMITH, V. E. N84-13699
SMITH, V. V. N84-14087
SMITH, W. W. N84-13218
SMITS, R. G. N84-13467
SNECK, H. J. N84-13388
SNIDER, M. A. N84-13864
SNYMAN, C. N84-14064
SODEN, J. M. N84-13481
SOGA, K. N84-13200
SOHN, D. S. N84-13618
SOLOMON, A. A. N84-13327
SOLOMON, A. D. N84-13284
SOLOMON, A. S. P. N84-13187
SOMMER, W. F. N84-14048
SONDERICKER, J. H. N84-13383
SOO, S. L. N84-13908
SOONG, D. S. N84-13315
SOUERS, P. C. N84-13252
SOWA, P. N84-13675
SPEARMAN, M. L. N84-13138
N84-13139
SPEARS, J. W. N84-13460
SPENCER, D. P. N84-13266
SPENCER, J. E. N84-13482
SPENSE, P. W. N84-13465
SPINDLER, B. N84-13525
SPRANGLE, P. N84-13969
SRIVASTAVA, P. C. N84-13759
STAMMERS, S. M. N84-14067
STANG, R. G. N84-13303
STARK, M. A. N84-13465
STAVINOHA, L. L. N84-13337
STCLAIR, A. K. N84-13309
STECKER, F. W. N84-14103
STEFFEK, L. J. N84-13398
STEGBUCHNER, H. N84-13784
STEINMETZ, N. N84-13790
STEPHENS, J. R. N84-13264
STERRETT, V. J. N84-13667
STEVENS, C. G. N84-13252
STEVENS, K. B. N84-13709
STEVENS, S. N84-13686
STEWARD, S. A. N84-13279
STEWART, H. D. N84-13481
STILES, P. N84-13601
STILLMAN, D. W. N84-13993
STITH, J. J. N84-13978
STOAKLEY, D. M. N84-13309
STOCK, L. V. N84-13978
STOKER, G. C. N84-13597
STOLZ, A. N84-13416
STONE, R. H. N84-13223
STONE, T. A. N84-13652
STORACE, A. N84-13193
STREWIG, L. N84-13644
STRNAT, K. J. N84-14071
STRONG, E. G. N84-13161
STYGAR, W. A. N84-13939
N84-13951
SUBRAHMANYAM, K. B. N84-13610
SUDDETH, D. N84-13962
SUTTON, G. P. N84-13868
SWADLEY, W. C. N84-13716
SWANSON, J. L. N84-13720
SWART, D. H. N84-13496
N84-13497
SWARTZ, K. N84-14024
SWEENEY, M. A. N84-14010
SWEET, J. N. N84-13515
SZOEKE, A. N84-13566

T

TABACK, I. N84-13781
TAJIMA, T. N84-14099
TAKAHARA, K. N84-13611
TAKAMATSU, H. N84-13612
TAKEDA, H. N84-13365
TALASKA, D. N84-13467
N84-14049
TAMOR, S. N84-14019
TAN, L. S. N84-13454
TANAKA, T. N84-13703
TANASE, M. N84-13296
TARVER, C. M. N84-13528
TASSANO, P. L. N84-13992
TAVARES, S. A. N84-13884
TAYLOR, E. W. N84-13396
TAYLOR, J. D. N84-13467
N84-14049
TAYLOR, T. R. N84-13776
TENEKETZIS, D. N84-14065
TERADA, S. N84-13476
THERIAULT, D. G. N84-13826
THIESSEN, H. A. N84-13478
N84-13952
THODE, L. E. N84-13433
N84-13440
THOMAS, A. M. N84-13217
THOMAS, J. J. N84-14069
THOMAS, J. L. N84-14067
THOMAS, M. T. N84-13289
THOMAS, R. E. N84-13473
THOMAS, R. H. N84-13827
THOMAS, W. H. N84-13757
THOMPSON, D. O. N84-13598
N84-13928
THOMPSON, P. A. N84-13388
THOMPSON, R. B. N84-13598
N84-13599
N84-13621
THOMSON, R. G. W. N84-13444
TIERNAN, T. O. N84-13975
TIMBERLAKE, A. B. N84-13313
TIRA, J. S. N84-13229
TISCHLER, J. Z. N84-14068
TITTMANN, B. R. N84-13620
TOBIAS, D. A. N84-13326
TOBIN, R. G. N84-13973
TOLLIVER, J. S. N84-14000
TOLSTIKOV, G. I. N84-13594
TONG, C. H. N84-13281
N84-13282
TOPPILA, S. N84-13785
TORTORELLI, P. F. N84-13293
TOWNE, C. E. N84-13494
TOWNES, S. A. N84-13414
TOWNSEND, T. L. N84-13736
TOWNSEND, W. B. N84-13867
TOWNSHEND, J. R. G. N84-13631
TOWSHEND, J. R. N84-13627
TRAINOR, R. J. N84-13287
TRAVESI, A. N84-13816
TRESTER, P. N84-14014
TRICKEY, H. N84-13820
TRIPP, R. D. N84-13253
TRKULA, M. N84-13572
TROY, J. J. N84-13829
TRUONG, T. K. N84-13406
TRUSCHEL, A. D. N84-13658
TSAI, S. T. N84-14020
N84-14027
TSANG, K. T. N84-13561
TSAPKO, V. K. N84-13594
TSIEN, H. N84-13463
TSUDA, Y. N84-13376
TSUGAWA, R. T. N84-13252
TUDE, E. A. P. N84-13445
TURNER, D. N84-13845
TURNIPSEED, G. T. N84-13183
TUSCHY, E. N84-13381
TVERSKY, A. N84-13778
TWOGOOD, R. E. N84-13848

U

UCZKIEWICZ, J. N84-13451
ULABY, F. T. N84-13635
ULRICKSON, M. N84-13273
UNDERWOOD, K. H. N84-13717
N84-13718
URIBE, F. S. N84-13279
URTIEW, P. A. N84-13528
USRY, J. W. N84-13172

V

VADALI, S. R. N84-13870
VADYAK, J. N84-13158
N84-13159
VAHRENKAMP, R. N84-13457
VAINSHTEIN, A. A. N84-13261
VALANE, R. F. N84-13656
VALLET, C. E. N84-13254
VAN DAM, J. W. N84-14020
VANAARDT, J. H. P. N84-13311
VANARSDALL, P. J. N84-13436
VANDAM, J. W. N84-14027
VANDENBROEK, G. J. N84-13156
VANDERHELD, E. F. M. N84-13502
VANDERLEEDEN, G. A. N84-13684
VANDERMEER, R. A. N84-13280
VANDERSANDE, J. B. N84-13281
N84-13282
N84-13283
VANIER, P. E. N84-14058
VANKA, S. P. N84-13518
N84-13527
VANMAARSEVEEN, I. L. N84-13233
VANROOYEN, J. N84-13777
VANSLYKE, H. N84-14049
VANSLYKE, V. N84-13467
VANVUUREEN, D. S. N84-13234
VEDRENNE, G. N84-14083
VEST, K. F. N84-13817
VISSER, S. N84-13311
VITEK, J. M. N84-13285
VOGEL, H. F. N84-14023
VOGLER, L. E. N84-13442
VOISINET, R. L. P. N84-13227
VOLAND, R. T. N84-13608
VONGLAHN, U. H. N84-13922
VREEDE, F. A. N84-13535
VREELAND, T., JR. N84-14038
VUORINEN, M. N84-13793
N84-13796

W

WAGNER, F. T. N84-13245
WAGSTAFF, F. J. N84-13669
WAKAMATSU, T. N84-13347
N84-13353
WAKENELL, J. F. N84-13340
WALKER, F. E. N84-14047
WALKINGTON, P. D. N84-13597
WALLACE, R. K. N84-14092
WALLERSTEDT, R. L. N84-13710
WALSH, W. J. N84-13466
WALTER, C. E. N84-13589
WALTER, E. N84-13320
WANDEL, A. S. N84-14088
WANG, C. N84-13786
WANG, C. C. N84-13406
WANG, C. L. N84-13672
N84-13673
WANG, C. Y. N84-14089
WANG, F. N84-13990
WANG, F. C. N84-13551
WANG, S. S. N84-13221
N84-13222
WARD, R. L. N84-13339
WARNER, A. N84-13459
WARNER, D. N., JR. N84-13198
WARNER, R. A. N84-13571
WARREN, J. L. N84-13952
WATANABE, Y. N84-13356
WATSON, D. M. N84-13198
N84-14045
WATSON, G. W., JR. N84-14062
WATT, R. D. N84-13467
N84-14049
WATT, T. R. N84-13830
WATTERS, D. M. N84-13184
WAUTERS, D. K. N84-13225
WEAVER, P. L. N84-13665
WEI, I. C. N84-13524
WEIL, D. A. N84-13237
WEINSTEIN, C. J. N84-13421
WEISBRICH, A. L. N84-13186
WEITSMAN, A. N84-13787
WELCH, D. O. N84-13477
WELCH, J. D. N84-13171
WELCH, R. N84-13633
WERBELOFF, M. N84-13776
WERTH, J. N84-13672
N84-13673
WESELY, M. L. N84-13717
WESSMAN, M. D. N84-13506
WEST, H. I., JR. N84-13957
WESTBROOK, R. D. N84-13684
WESTMACOIT, K. H. N84-13540
WETHINGTON, R. N84-13699
WETZEL, P. J. N84-13735
WETZEL, R. G. N84-13761
WHALEN, J. F. N84-13970
WHEELER, J. W. N84-14093
WHELAN, J. A. N84-13672
N84-13673
WHITAKER, R. B. N84-13231
WHITHAM, K. N84-14028
WHITLOW, W., JR. N84-13150
WIESMANN, H. N84-14058
WIGGINS, D. J. N84-13531
WILDMAN, G. C. N84-13324
WILKINS, M. L. N84-13588
WILKINSON, M. K. N84-14045
WILLBANKS, E. W. N84-13863
WILLEN, E. N84-13982
WILLIAMS, C. S. N84-13474
WILLIAMS, G. A. N84-14084
WILLIAMS, G. P. N84-13539
WILLIAMS, W. F. N84-13407

WILSON, A. N84-13627
WILSON, D. G. N84-13264
WILSON, J. W. N84-13978
WIRINGA, R. B. N84-13938
WITHINGTON, J. R. N84-13410
WOGMAN, N. A. N84-13944
WOLF, C. J. N84-13318
WOLFER, W. G. N84-13291
WONG, C. P. C. N84-14014
WOOD, E. L., JR. N84-13277
WOOD, R. F. N84-13684
WOODFIELD, T. J. N84-13831
WOODWELL, G. M. N84-13652
WOOLUM, D. S. N84-14097
WOOSLEY, S. E. N84-14092
WORMECK, J. J. N84-13240
N84-13244
N84-13514
WORMELY, S. J. N84-13598
WORREST, R. C. N84-13694
WRIGHT, T. P. N84-13977
WU, K. C. N84-13383
N84-13385
WU, R. L. C. N84-13975
WU, S. T. N84-13390
WU, T. T. N84-13418
WUENSCH, B. J. N84-14044
WYKES, J. H. N84-13197
WYLIE, G. J. N84-13830

X

XIEGI, M. N84-13333

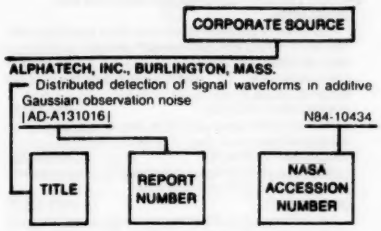
Y

YAHIEL, D. I. N84-13773
YAMADA, R. N84-13394
YAMAGISHI, F. G. N84-13310
YAMANA, T. N84-13347
N84-13379
YAMASHITA, S. N84-13802
YAMAZAKI, T. N84-13200
YANG, L. N84-14040
YANNIAN, H. N84-13334
YANO, H. N84-13839
YAO, N. P. N84-13472
YECHOUT, R. T. N84-13215
YEH, A. N84-13889
YEH, G. T. N84-13648
YELTON, R. O. N84-13231
YOSHIDA, M. N84-13375
YOUNG, A. N84-13463
YOUNG, C. E. N84-13567
YOUNG, F. W., JR. N84-14045
YOUNG, J. E. N84-13180
YOUNG, R. T. N84-13684
YOUNGMAN, R. A. N84-13329
YU, F. T. S. N84-13417
YURA, H. T. N84-13428
YUSA, S. N84-13349
N84-13375

Z

ZACHARY, L. W. N84-13599
ZAKOWICZ, W. N84-13969
ZALUZEC, N. J. N84-13241
ZANROSSO, E. M. N84-14100
ZBASNIK, J. P. N84-13918
ZERILLI, F. J. N84-13935
ZHANG, Q. F. N84-13187
ZIMM, C. B. N84-13307
ZIMMERMAN, D. K. N84-13670
ZIMMERMAN, S. P. N84-13713
ZIMMERMANN, M. N84-13212
ZIZKA, E. R. N84-14075
ZOLLARS, G. J. N84-13215
ZUCCA, R. N84-13457
ZUHR, R. A. N84-14004
ZWEINER, J. W. N84-13211

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ACTON RESEARCH CORP., MASS.
Investigation of soft X-ray reflective coatings
[DE84-000510] N84-14025

ACUREX CORP., MOUNTAIN VIEW, CALIF.
Residual shale-oil/diesel-engine operating compatibility program
[DE84-000133] N84-13587

AERONAUTICAL RESEARCH INST. OF SWEDEN, STOCKHOLM.
Development of a computer code for a three-dimensional higher order panel method for subsonic potential flow
[FFA-138] N84-13155

AERONAUTICAL RESEARCH LABS., MELBOURNE (AUSTRALIA).
Power effects on the longitudinal characteristics on single-engine propeller-driven aircraft
[ARL-AERO-REPT-157] N84-13174

Engine performance monitoring: Rolls-Royce Dart and Allison T56 turbo-prop engines
[ARL-MECH-ENG-NOTE-393] N84-13191

Improving the fatigue performance of thick aluminum alloy bolted joints by hole cold-expansion and the use of interference-fit steel bushes
[ARL-STRUC-NOTE-486] N84-13578

Initial estimates of damping rates and frequencies
[ARL-STRUC-NOTE-485] N84-13879

A solution technique for complex matrix games
[ARL-SYS-NOTE-83] N84-13910

AEROSPACE CORP., EL SEGUNDO, CALIF.
Aperture averaging of scintillation for space-to-ground optical communication applications
[AD-A132198] N84-13428

AEROSPACE CORP., LOS ANGELES, CALIF.
Laser-induced fluorescence spectroscopy for improved chemical analysis
[DE84-000629] N84-13243

AGRICULTURAL RESEARCH CENTER, BELTSVILLE, MD.
Information content of data from the LANDSAT 4 Thematic Mapper (TM) and multispectral scanner (MSS)
[E84-10034] N84-13628

AIR FORCE ACADEMY, COLO.
Experimental aerodynamic characteristics of missiles with square cross sections
[AD-A132278] N84-13215

AIR FORCE ENVIRONMENTAL TECHNICAL APPLICATIONS CENTER, SCOTT AFB, ILL.
An aid for using the Revised Uniform Summary of Surface Weather Observations (RUSSWOs)
[AD-A132186] N84-13742

AIR FORCE GEOPHYSICS LAB., HANSCOM AFB, MASS.
Air mass computer program for atmospheric transmittance/radiance calculation: FSCATM
[AD-A132108] N84-13712

On the determination of the index of refraction of the atmosphere
[AD-A132107] N84-13713

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
Bank-to-turn control
[AD-A132491] N84-13214

Computer-aided synthesis and design of monolithic microwave GaAs MESFET amplifiers
[AD-A132474] N84-13452

Holographic optical elements with ultra-high spatial frequencies
[AD-A132355] N84-13537

Wear during rubbing of a sintered metal powder body
[AD-A132354] N84-13584

Formal techniques in the management of software design
[AD-A132569] N84-13818

Interactive surface visualization using raster graphics
[AD-A132548] N84-13819

Great sphere fibrations of manifolds
[AD-A132544] N84-13888

A study of thick-target X-ray spectra using photonuclear reactions
[AD-A132543] N84-13934

AIR FORCE SYSTEMS COMMAND, PATRICK AFB, FLA.
Operational applications of military test ranges in space transportation system programs
[AD-A132535] N84-13217

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Shot to the moon from a cannon
[AD-A132554] N84-13216

A comment on the plateau combustion mechanism of the double-base propellants
[AD-A132551] N84-13333

Weightlessness and management of liquid rocket propellant
[AD-A132516] N84-13334

China builds first 6000kV type pulse voltage generator
[AD-A132564] N84-13449

Outline of methods for design of superconducting turbogenerators
[AD-A132528] N84-13451

NdP5O14 crystal used for miniature rangefinder
[AD-A132541] N84-13549

The DJS-054II microcomputer
[AD-A132552] N84-13807

Is it superconductivity at 293 k?
[AD-A132545] N84-14037

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
Evaluation of stress corrosion cracking characteristics of selected fastener systems in 7075-T6 aluminum
[AD-A132162] N84-13272

Storage of synthetic turbine lubricants under adverse conditions
[AD-A132226] N84-13319

Determination of a jet fuel metal deactivator by high performance liquid chromatography
[AD-A132220] N84-13336

ALLEN-BRADLEY CO., TORRANCE, CALIF.
Development and fabrication of a high current, fast recovery power diode
[NASA-CR-168196] N84-13443

ALLIED CHEMICAL CORP., MORRISTOWN, N.J.
Development of a residential gas-absorption heat pump
[DE83-017218] N84-13526

AMERICAN UNIV., WASHINGTON, D. C.
The localized corrosion of aluminum alloys: A review
[AD-A132582] N84-13269

AMES LAB., IOWA.
Elastic-wave scattering from multiple voids (porosity)
[DE83-018076] N84-13598

Effects of crack closure on ultrasonic transmission
[DE83-018073] N84-13599

Absolute determination of stress in textured materials
[DE83-018083] N84-13621

Ultrasonic 3-D reconstruction of inclusions in solids using the inverse Born algorithm
[DE83-018082] N84-13928

Effects of a finite aperture on the inverse born approximation
[DE83-018086] N84-13930

ARGONNE NATIONAL LAB., ILL.
Quantum-mechanical calculations of the properties of liquid He droplets'
[DE84-000164] N84-13220

Electron-energy-loss spectral library and its application to materials science
[DE84-000588] N84-13241

Corrosion of ferrous alloys in eutectic lead-lithium environments
[DE84-000593] N84-13292

Influence of a flowing-lithium environment on the fatigue and tensile properties of type 316 stainless steel
[DE84-000611] N84-13295

Field maintenance of radiation-shielding windows at HFEF
[DE83-015376] N84-13326

Annotated bibliography of battery evaluations
[DE84-000653] N84-13466

Solid-oxide fuel cells
[DE83-017925] N84-13469

Application features and considerations in advanced lead-acid and nickel/iron EV batteries
[DE83-017936] N84-13472

Moltencarbonate fuel cells, development status
[DE84-000612] N84-13480

Solubility of the NiO fuel-cell cathode in Li2CO3 melts as determined by cyclic voltammetry
[DE83-014311] N84-13485

Computations of turbulent recirculating flows with fully coupled solution of momentum and continuity equations
[DE84-001529] N84-13518

Fully-coupled solution of pressure-linked fluid flow equations
[DE83-017989] N84-13527

Narrow-band, near-UV, high-repetition-rate laser-induced fluorescence system for use as an dge diagnostic in fusion machine
[DE84-000586] N84-13567

Oxygen-18 measurements in the assessment of natural and anthropogenic sulfur in the environment
[DE84-000566] N84-13690

The effects of relaxing automobile emission standards: A generic analysis and an urban case study
[DE84-000193] N84-13693

Surface heat flux derived from sodar amplitude and frequency data: A comparison
[DE83-017930] N84-13717

A comparison of frequency determination using real sodar data
[DE83-017942] N84-13718

Computer software summaries, numbers 424 through 693
[DE83-015297] N84-13834

Participation of VAX VMS computers in IBM file-transfer networks
[DE83-017945] N84-13838

Algorithms for automated diagnosis of faults in physical plant
[DE84-000192] N84-13841

CEREAS: An interactive computer-mapping system for environmental assessments
[DE83-017927] N84-13864

Averaging procedures of multiphase conservation equations
[DE83-014698] N84-13908

Development of ultrasonic methods for the nondestructive inspection of concrete
[DE83-017923] N84-13929

The 3-body forces, relativistic effects, isobars, and pions in nuclear systems
[DE84-000163] N84-13938

ASPUN, Argonne super intense pulsed pallation neutron source
[DE84-000311] N84-13941

Meson-exchange Hamiltonian for NN scattering and isobar-nucleus dynamics
[DE83-017974] N84-13959
Relativistic-beam pickup test facility
[DE83-017929] N84-13962
Multiquark exotics
[DE83-017958] N84-13964
Neutron total cross section measurements in the energy region from 47 keV to 20 MeV
[DE84-001400] N84-13970
Proceedings of the Summer Workshop on Proton Decay Experiments
[DE83-009572] N84-13980
Neutron measurements and radiation damage calculations for fusion materials studies
[DE83-014790] N84-14011
Comparison of measured and calculated helium production in nickel using newly evaluated neutron cross sections for (59)Ni
[DE84-000565] N84-14035
Host-lattice effects in the spin-orbit fine structure of vacancy-trapped electrons
[DE84-000599] N84-14052
Magnetic properties of Mo/Ni superlattices
[DE84-000568] N84-14053
Neutron-scattering studies of magnetic superconductors
[DE84-000393] N84-14054
Tools for the creation of IMS database designs from Entity-Relationship diagrams
[DE84-000592] N84-14066
Energy-efficient automobiles for the future
[DE84-000600] N84-14073

ARIZONA STATE UNIV., TEMPE.
Positive biharmonic functions N84-13786

ARIZONA UNIV., TUCSON.
In-flight absolute radiometric calibration of the thematic mapper
[E84-10044] N84-13637
Spectroradiometric calibration of the thematic mapper and multispectral scanner system
[E84-10045] N84-13638
Respiratory effects on population from low-level exposures to ozone
[PB83-246132] N84-13774

ARMY AEROMEDICAL RESEARCH LAB., FORT RUCKER, ALA.
Helicopter In-flight Monitoring System second generation (HIMS 2)
[AD-A132498] N84-13179

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, DOVER, N. J.
N(2) and CO vibrational CARS and h(2) rotational CARS spectroscopy of CH(4)-N(2)O flames
[AD-A132234] N84-13238

ARMY AVIATION ENGINEERING FLIGHT ACTIVITY, EDWARDS AFB, CALIF.
Flight testing the Rotor Systems Research Aircraft (RSRA)
[NASA-TM-85852] N84-13177

ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND, ST. LOUIS, MO.
An airborne color video inserter
[AD-A132183] N84-13185

ARMY COLD REGIONS RESEARCH AND ENGINEERING LAB., HANOVER, N. H.
Glaciological data: Permafrost. A bibliography, 1978 - 1982
[PB83-249730] N84-13724

ARMY ELECTRONICS RESEARCH AND DEVELOPMENT COMMAND, WHITE SANDS MISSILE RANGE, N. MEX.
Curve fit technique for a smooth curve using Gaussian sections
[AD-A132499] N84-13893

ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
Environmental impact research program. Two-equation, depth-integrated turbulence closure for modeling geometry-dominated flows
[AD-A132347] N84-13505
Petrographic examination of Bell Canyon Tests (BCT) 1-FF field grouts over a 3-year period
[DE83-018226] N84-13654

ARMY MATERIALS AND MECHANICS RESEARCH CENTER, WATERTOWN, MASS.
Characterization of ceramic vane materials for 10KW turboalternator
[AD-A132505] N84-13196
Computer-based ultrasonic multiple-frequency pulse-echo test system
[AD-A132227] N84-13926

ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT COMMAND, FORT BELVOIR, VA.
The determination of research octane number of gasoline fuels by octane analyzer
[AD-A132427] N84-13335
Baseline and verification tests of the electric vehicle associates' current fare station wagon
[AD-A132549] N84-14072

ARMY TEST AND EVALUATION COMMAND, ABERDEEN PROVING GROUND, MD.
Integrated logistic supportability (Aviation materiel)
[AD-A132367] N84-13146

AUBURN UNIV., ALA.
Phase and compression behavior in sedimentation and thickening of liquid-solid suspensions
[PB83-249664] N84-13257

AVCO LYCOMING DIV., STRATFORD, CONN.
Development of recuperator manufacturing techniques, phase 2
[AD-A132448] N84-13581

B

BATES (ALBERT), SUMMERTOWN, TENN.
Collapsible photovoltaic-concentrator array portable power from the Sun
[DE84-000713] N84-13677

BATTELLE COLUMBUS LABS., OHIO.
Creep fatigue of low-cobalt superalloys: Waspalloy, PM U 700 and wrought U 700
[NASA-CR-168260] N84-13265
Analysis of lead-acid battery accelerated testing data
[DE83-017403] N84-13473
Models of simultaneous heat and moisture transfer in soils
[DE84-001580] N84-13513
Feasibility of using a large press (80,000 - 200,000 tons) for manufacturing future components on Army systems
[AD-A132398] N84-13582
The organic geochemistry of deep ground waters and radionuclide-partitioning experiment: Under hydrothermal conditions
[DE83-015784] N84-13651

BATTELLE PACIFIC NORTHWEST LAB., SEQUIM, WASH.
Fate and effects of metals in the sea-surface microlayer
[DE84-000114] N84-13752

BDM CORP., ALBUQUERQUE, N. MEX.
Design analysis of advanced photovoltaic technologies
[DE84-000008] N84-13675

BENDIX CORP., KANSAS CITY, MO.
Continuous plasma treatment and resin impregnation of a high-strength fiber material
[DE84-000314] N84-13229
Vapor degreaser/ultrasonic cleaner solvent evaluation
[DE84-002015] N84-13331
Coordinate-measuring machine capability
[DE84-002014] N84-13544
Description of a method and artifact for estimating volumetric uncertainty of coordinate measuring machines
[DE84-002017] N84-13545
Investigation in the application of computer-aided process-planning techniques for mechanical engineering at Bendix Kansas City
[DE84-000302] N84-13842

BENDIX FIELD ENGINEERING CORP., GRAND JUNCTION, COLO.
Assessment of quality of data on tapes from the hydrogeochemical and stream sediment reconnaissance
[DE83-017697] N84-13647

BIONETICS CORP., HAMPTON, VA.
Technology evaluation of man-rated acceleration test equipment for vestibular research
[NASA-CR-172160] N84-13781

BOEING AEROSPACE CO., SEATTLE, WASH.
Study of auxiliary propulsion requirements for large space systems, volume 2
[NAA-CR-168193] N84-13218
Analysis of regenerative fuel cells
[NASA-CR-171783] N84-13671

BOEING COMMERCIAL AIRPLANE CO., SEATTLE, WASH.
Specification for a Program for an Interative Aeroelastic Solution (PIAS)
[NASA-CR-172200] N84-13153

BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
A technical overview of the National Software Works
[AD-A132320] N84-13827

BOWLING GREEN STATE UNIV., OHIO.
Decision making and information processing under various uncertainty conditions
[AD-A132051] N84-13770

BRIGHAM YOUNG UNIV., PROVO, UTAH.
Battery transport data
[DE84-001640] N84-13462
Adaptations to a high fat diet which increase exercise endurance in male rats N84-13755

BRISTOL UNIV. (ENGLAND).
Glass fibre/epoxy resin interface life-time prediction
[AD-A132206] N84-13320

BRITISH BROADCASTING CORP., LONDON (ENGLAND).
Optical methods of measuring loudspeaker diaphragm movement
[BBC-RD-1983/13] N84-13396

BRITISH LIBRARY LENDING DIV., BOSTON SPA (ENGLAND).
Formation of structure of low-alloy steel inoculated with rare-earth metals and alkaline-earth metals
[BLL-M-35321] N84-13258
Non-uniformity of elastic micro-deformations in austenitic steels
[BLL-M-35357-(5828.4)] N84-13261
Predicting the base phase in the crystallization of eutectic alloys
[BLL-M-35347-(5828.4)] N84-13262
Methods of optimizing parameters of mechanisms performing repeated brief operations
[BLL-M-35352] N84-13575
Calculation of the life of components of metallurgical equipment from the parameter of failure probability
[BLL-M-35351-(5828.4F)] N84-13594
Approximate solution of the problem of thermoelasticity of a sphere with variable properties
[BLL-M-35369-(5828.4F)] N84-13606

BROOKHAVEN NATIONAL LAB., UPTON, N. Y.
Characterization of alloy 600 surfaces after exposure to a caustic environment
[DE83-018297] N84-13300
A helium refrigerator with features for supercritical pressure cooling
[DE84-017759] N84-13383
Combined cold compressor/ejector helium-refrigerator cycle
[DE83-017764] N84-13385
Neutrino-oscillation experiments at Brookhaven National Laboratory
[DE83-018275] N84-13476
The relationship between the martensitic phase transition and the superconducting properties of A15 compounds
[DE83-018186] N84-13477
Development of electrolysis-cell separator for 1250C operation. Advanced alkaline electrolysis cell development
[DE84-000439] N84-13484
Channel electron multiplier and optically coupled amplifier used as an incident-flux monitor
[DE84-001451] N84-13539
Kinetic and spectroscopic studies of cytochrome b-563 in isolated cytochrome b/f complex and in thylakoid membranes
[DE83-017982] N84-13760
Acceleration of heavy ions in the AGS and CBA
[DE83-017762] N84-13963
Conceptual design of a 300-GeV accelerator based on the inverse free-electron laser mechanism
[DE84-001471] N84-13969
Trends in exotic-atom research
[DE84-001679] N84-13974
Magnetic field measurements of superconducting magnets for the colliding beam accelerator
[DE83-017351] N84-13982
Colliding-beam-accelerator lattice
[DE83-017875] N84-14050
Radiation damage in silicon detectors
[DE84-001460] N84-14056
Effect of silane fraction on the optoelectronic and photovoltaic properties of RF-glow-discharge a-Si:H prepared from SiH4 + H2 mixtures
[DE83-016730] N84-14058

BUILDING RESEARCH INST., TOKYO (JAPAN).
Proceedings of the 6th Joint Panel Meeting: UJNR Panel on Fire Research and Safety N84-13341
Building systems and smoke control N84-13347
Present state of research in Japan on toxicities of gases during fire N84-13349
A study on sound guidance for evacuation: Effect of megaphoned evacuation guidance in smoke N84-13356
Thermal instability in transient compartment fire: An approach to characterize flashover and estimate its mechanisms N84-13366
Similarity analysis of the flow characteristics in diffusion flames N84-13367
US-Japan cooperative research on evaluation of toxicity N84-13375
Proposed plan for joint research program between Japan, the USA and Canada concerning gas toxicity in fires N84-13378
On smoke control experiments N84-13379

BUREAU OF MINES, PITTSBURGH, PA.
Correlation of LANDSAT and air photo linears with roof control problems and geologic features
[PB83-250852] N84-13656

BUREAU OF MINES, ROLLA, MO.
Digital instrumentation package or an improved torsion pendulum
[PB83-240424] N84-13547
Copper-manganese-base silverless brazing systems
[PB83-250100] N84-13593

C

CALIFORNIA INST. OF TECH., PASADENA.
Experiments on mixing and combustion with low heat release in a turbulent shear flow N84-13489
Analysis and control of quasi distributed parameter systems N84-13603
The propagation and arrest of an edge crack in an elastic half-space under conditions of anti-plane shear: Analytical and numerical results N84-13604
The emergence and propagation of a phase boundary in an elastic bar
[AD-A132275] N84-13616
Impact cratering and spall failure at gabbro
[NASA-CR-174618] N84-13704
X-ray and backscattering analysis of ion implantation phenomena in GaAs and related compounds
[AD-A132429] N84-14038
A study of A- and B-type stars in the southern galactic halo N84-14077
Sounding rocket XUV observations of Capella N84-14078
Eclipse mapping of accretion disks in cataclysmic binaries N84-14080
Radiative transfer and photochemistry in the upper atmosphere of Jupiter N84-14095

CALIFORNIA UNIV., BERKELEY.
Numerical modeling of turbulent flow in a channel
[NASA-CR-168278] N84-13189
Computational models for cyclic plasticity, rate dependence and creep in finite element analysis
[PB83-245829] N84-13308
Diffusion and sorption of cyclohexane vapor in SBS and SBR copolymers
[AD-A132397] N84-13315
Flame heights, flame radiation and flame spread N84-13371
A general framework for learning curve reliability growth models
[AD-A132277] N84-13596
Analysis of the quality of image data acquired by the LANDSAT-4 Thematic Mapper (TM) of the Black Hills area, South Dakota
[E84-10041] N84-13634
File migration in distributed computer systems N84-13860
Using simulation to estimate first passage distributions
[AD-A132328] N84-13898

CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Application of surface-physics techniques to the study of electrochemical systems
[DE84-000957] N84-13245
Selective catalytic hydrogenation of polynuclear heteroaromatic nitrogen compounds with polymer-supported transition-metal compounds
[DE84-001326] N84-13248
Molecular basis for local compositions in liquid-mixture models
[DE83-016604] N84-13250
Dissociative ionization of liquid water induced by vibrational overtone excitation
[DE83-017739] N84-13251
Problems and prospects in strange baryon spectroscopy
[DE83-018119] N84-13253
Calculations of composition boundaries of saturated phases
[DE84-001665] N84-13274
Control and operation cost optimization of the HISS cryogenic system
[DE83-017741] N84-13384
Cryogenic testing of the TPC superconducting solenoid
[DE84-000528] N84-13467
Evaluation of Hamamatsu R1635 photomultiplier
[DE84-001252] N84-13468
Low-noise gallium-arsenide field-effect transistor preamplifiers for stochastic beam-cooling systems
[DE83-017535] N84-13475
Heat transfer to subcooled HE 1
[DE83-017767] N84-13520
Proceedings of the Seventh International Conference on High Voltage Electron Microscopy
[DE83-016323] N84-13540
Effects of compensation on light-induced metastable defects in aSi:H
[DE83-016696] N84-13680
Statistical properties of deep inelastic reactions
[DE84-000722] N84-13943
Summary of the status of negative-ion-based neutral beams
[DE84-001328] N84-13948
New concepts in particle acceleration
[DE83-017747] N84-13961
Vibrational spectroscopy of chemisorbed molecules by infrared emission
[DE84-000956] N84-13973
Fast, self-nulling spectroscopic ellipsometer: Instrumentation and application, revision
[DE83-015531] N84-13994
Forced two-phase cooling of the TPC superconducting solenoid
[DE83-017749] N84-14049

CALIFORNIA UNIV., IRVINE.
Test of the inverse square law of gravity at distances of 5cm and 1m N84-13914
The MHD stability of inertia-tied Z-pinches with application to solar coronal loops N84-13932
Intermolecular energy-transfer processes
[DE84-000334] N84-13971

CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
A laser-fusion rocket for interplanetary propulsion
[DE84-001238] N84-13219
Overview of composites capability at Lawrence Livermore National Laboratory
[DE84-001086] N84-13228
Statistical analysis of Kevlar 49/epoxy composite stress-rupture data
[DE84-000516] N84-13230
Vacuum outgassing of various materials
[DE84-001449] N84-13247
Electrolytic gettering of tritius from air
[DE84-000174] N84-13252
Reduction of tritium permeation through iron using aluminum-ion implantation
[DE84-000184] N84-13279
Aluminum as a global high-pressure equation-of-state standard
[DE84-000153] N84-13287
Bound and free moisture in explosives and plastics
[DE84-001402] N84-13339
NOVANET: Communications network for a control system
[DE83-013862] N84-13436
Air-breakdown limits for microwave-pulse propagation. Part 1. Experiments
[DE83-017832] N84-13438
An FET full-bridge switcher for inductorless capacitor charging for Nova
[DE83-018005] N84-13471
Further studies on equal-order interpolation for Navier-Stokes
[DE84-000916] N84-13512
Theoretical modeling of converging and diverging detonation waves in solid and gaseous explosives
[DE83-017300] N84-13528
Aethalometer: An instrument for the real-time measurement of optical absorption by aerosol particles
[DE84-000400] N84-13538
Measuring the neutron energy spectrum of laser-fusion targets with CR-39
[DE84-001422] N84-13543
Large laser system facility design
[DE84-000159] N84-13553
Simulation of a high-gain tapered-wiggler free-electron laser
[DE84-001237] N84-13557
Inertial effects in laser-drive ablation
[DE84-000071] N84-13566
The Nova laser assurance-management system
[DE83-018188] N84-13568
A programmable controller with overcurrent latch for constant primary peak current in capacitor-charging FET switcher for Nova
[DE83-018184] N84-13569
Modelling the behavior of materials
[DE84-000154] N84-13588
Flywheel rotor and containment technology development, FY83
[DE83-017615] N84-13589
Penetrant and magnetic-particle inspection for material integrity
[DE83-017830] N84-13600
Microwave nondestructive evaluation of composites
[DE84-001777] N84-13601
Kriging of geological and physical parameters from Yucca Flat, NTS
[DE83-018227] N84-13625
Atmospheric dispersion of ammonia: An ammonia fog model
[DE84-000165] N84-13689
Commentary on the recent CO2-climate controversy
[DE83-016367] N84-13722
Communicating between the IBM personal computer and the Wang word-processing system
[DE83-017987] N84-13809
Vectorizing and machine-spanning techniques
[DE84-000469] N84-13810
FACET: A radiation-view-factor computer code for axisymmetric, 2D planar and 3D geometries with shadowing
[DE84-000359] N84-13835
SISAL: Streams and Iteration in a Single-Assignment Language. Language reference manual, version 1.1
[DE83-016576] N84-13843
T-HEMP3D user manual
[DE84-000526] N84-13845
Overview of digital-image processing
[DE84-000156] N84-13848
Computer implementation, accuracy, and timing of radiation view-factor algorithms
[DE83-017618] N84-13849
Detailed introduction and reference manual for: The network-shared-memory distributed database system
[DE83-017547] N84-13865
Introduction to flexible manufacturing systems: Their applications, classification, and opportunities
[DE83-017373] N84-13868
Application of the implicit Fourier-expansion method to the calculation of three-dimension equilibria by the iterative method
[DE83-017621] N84-13902
Analytical studies of advanced high-field designs: 20-Tesla large-bore superconducting magnets
[DE83-017591] N84-13918
Beam dynamics in the Advanced Test Accelerator (ATA)
[DE84-001421] N84-13947
Calculation of ion charge-state distribution in ECR ion sources
[DE84-000517] N84-13957
Interaction of a stream of dielectric spheres in an electric field in a high vacuum
[DE83-013695] N84-13958
Scientific program and abstracts
[DE83-017620] N84-13967
Resonance-resonance coupling in dissociative electron attachment
[DE84-001767] N84-13972
Fiber optics temperature and pressure probe
[DE84-001785] N84-13990
Instrumentation for remote sensing over fiber optics
[DE84-001788] N84-13991
Deposition of cesium iodide on papylene
[DE83-017839] N84-13992
Precision support of annular optics
[DE83-017473] N84-13993
Construction and operational experience of the tandem mirror experiment-upgrade (TMX-U)
[DE83-018181] N84-13995
Evolution of the mirror machine
[DE83-016942] N84-14009
TMX-U diagnostic system
[DE83-017834] N84-14015
Infant-mortality testing of high-energy-density capacitors used on Nova
[DE83-018027] N84-14028
Simulation of shock-induced energy flux in molecular solids
[DE84-001157] N84-14047
TIS: An intelligent gateway computer for information and modeling networks. Overview
[DE83-017986] N84-14067
Physics of the synchrotron model of cosmic gamma-ray bursts
[DE84-000917] N84-14104
Theory of optical flashes
[DE84-001450] N84-14106

CALIFORNIA UNIV., LOS ANGELES.
Characterization of carbon fiber composites using acousto-ultrasonic techniques
[AD-A132305] N84-13317
Optimization of structures subjected to periodic loads N84-13605
Observations and theory of irregularities of middle latitude sporadic E layers N84-13703
Positive biharmonic functions N84-13786
Nonlinear acoustics in a dispersive continuum: Random waves, radiation pressure, and quantum noise N84-13920

Ponderomotive effects in nonneutral plasmas
[AD-A132109] N84-13998

CALIFORNIA UNIV., RIVERSIDE.
Medium energy gamma rays from the galactic center region N84-14100

CALIFORNIA UNIV., SAN DIEGO.
Investigation of the wall pressure, wall shear stress and velocity fields associated with a turbulent spot in a laminar boundary layer N84-13488
A variational method for estimating the general circulation in the ocean N84-13626
Energization of ions by oblique double layers N84-13700

CALIFORNIA UNIV., SANTA BARBARA.
Analysis of hydrogen attack on pressure-vessel steels
[DE84-000061] N84-13301

CALIFORNIA UNIV., SANTA CRUZ.
Respiration of roots response to low O2 stress
[DE83-017495] N84-13766

CALSPAN ADVANCED TECHNOLOGY CENTER, BUFFALO, N.Y.
Study of the contained air flow in a radial tire: Experimental
[DE84-000840] N84-13591

CAPE TOWN UNIV. (SOUTH AFRICA).
The plane stress/strain analysis of non-homogeneous continua by the boundary integral equation method
[TR-821S] N84-13880
NOSTRUM: A finite element program for nonlinear structural mechanics
[TR-18] N84-13881

CARNEGIE-MELLON UNIV., PITTSBURGH, PA.
Finite elements and the divergence constraint for viscous flows N84-13486

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO.
Three-dimensional analysis of chevron-notched specimens by boundary integral method
[NASA-CR-172225] N84-13607

CATHOLIC UNIV. OF AMERICA, WASHINGTON, D.C.
An analysis of acoustic and seismic wave resonances N84-13701

CHEMICAL ENGINEERING RESEARCH GROUP, PRETORIA (SOUTH AFRICA).
Fischer-Tropsch synthesis in slurry reactors: Summary and analysis of the state of the art
[CSIR-CENG-432] N84-13234
The effect of surface charge on the rheology of concentrated aqueous quartz suspensions
[CSIR-CENG-423] N84-13235
The role of the tetrapropylammonium template in the synthesis of zeolite ZSM-5
[CSIR-CENG-413] N84-13236

CINCINNATI UNIV., OHIO.
Modelling of submerged cable dynamics
[AD-A132495] N84-13580
User's manual for CABLE: A three-dimensional, finite-segment computer code for submerged and partially submerged cable systems
[AD-A132515] N84-13821

CITY UNIV. OF NEW YORK, N. Y.
The effect of opacity on theoretical models of RR Lyrae stars N84-14081
Large scale galactic shocks and motions of the cloud medium N84-14089

CIVIL AERONAUTICS BOARD, WASHINGTON, D.C.
Deregulating the airlines: An economic analysis
[PB83-250019] N84-14070

CLARK UNIV., WORCESTER, MASS.
Splice and Malcev algebras N84-13911

CLARKSON COLL. OF TECHNOLOGY, POTSDAM, N.Y.
Raman and fluorescent scattering by molecules embedded in small particles
[DE84-001278] N84-13937

CLEMSON UNIV., S.C.
Fire and smoke retardants N84-13343

COLORADO STATE UNIV., FORT COLLINS.
SISAL: Streams and Iteration in a Single-Assignment Language. Language reference manual, version 1.1
[DE83-016576] N84-13843
Prediction of high-pressure phase transitions in solid N2 and the pressure dependence of the intramolecular vibrational frequencies
[DE83-015260] N84-14057

COLORADO UNIV., BOULDER.
Glaciological data: Permafrost. A bibliography, 1978 - 1982
[PB83-249730] N84-13724

COLUMBIA UNIV., NEW YORK.
The development of an imaging gas scintillation proportional counter for use in X-ray astronomy N84-14079

COMMITTEE ON SCIENCE AND TECHNOLOGY (U. S. HOUSE).
Aircraft navigation technology and errors
[GPO-26-859] N84-13170

COMPUTER SYSTEMS MANAGEMENT, INC., ARLINGTON, VA.
The development and application of an advanced computer-based shared-graphic workstation for video teleconferencing
[AD-A132583] N84-13817

CONNECTICUT UNIV., STORRS.
Density of occupied d states in transition metal-metalloid metallic glasses
[DE84-001206] N84-13298
EXAFS study of Metglas 2605 CO
[DE84-001203] N84-13299

COORDINATING RESEARCH COUNCIL, INC., ATLANTA, GA.
Handbook of aviation fuel properties
[AD-A132106] N84-13338

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, PRETORIA (SOUTH AFRICA).
Work done to determine the source of errors on conditioned pressure transduce signals in the JT9D-7F turbofan engines used on SAA Boeing 747 aircraft
[NIAST-82/78] N84-13192
Symposium on Computers in Civil Engineering
[CSIR-S-267] N84-13806

D

DAYTON UNIV., OHIO.
Study and review of permanent magnets for electric vehicle propulsion motors
[NASA-CR-168178] N84-14071

DEFENCE RESEARCH ESTABLISHMENT VALCARTIER (QUEBEC).
Spatial filtering for enhancing point targets in images from a space-based mosaic IR detector
[AD-A132248] N84-13425
A frequency stabilization and trigger control unit for hybrid TEA-CO2 lasers
[AD-A132247] N84-13552
Aerosol size distribution using the extinction-sedimentation inversion technique
[AD-A132158] N84-13711

DEFENCE RESEARCH INFORMATION CENTRE, ORPINGTON (ENGLAND).
Welding deformations and residual stresses due to circumferential welding of cylindrical shells and hemispherical end plates
[DRIC-T-6968] N84-13602

DEFENSE MAPPING AGENCY HYDROGRAPHIC AND TOPOGRAPHIC CENTER, WASHINGTON, D.C.
Automated standard nautical chart production
[AD-A132249] N84-13644

DELTA INFORMATION SYSTEMS, INC., JENKINTOWN, PA.
Study of potential standardization of video teleconferencing systems. Volume 2: Appendices
[AD-A132081] N84-13431
Study of potential standardization of video teleconferencing systems, volume 1
[AD-A132080] N84-13432

DEPARTMENT OF ENERGY, UPTON, N.Y.
Summaries of physical research in the geosciences
[DE83-017885] N84-13624

DEPARTMENT OF ENERGY, WASHINGTON, D. C.
Standard NIM digital bus (NIM/GPIE)
[DE83-017865] N84-13435
Ecological Research Division marine research program
[DE83-017880] N84-13691

DESMATICS, INC., STATE COLLEGE, PA.
Motion sickness incidence: Distribution of time to first emesis and comparison of some complex motion conditions
[AD-A131930] N84-13772

DUGUTAL EQUIPMENT CORP., HUDSON, MASS.
SISAL: Streams and Iteration in a Single-Assignment Language. Language reference manual, version 1.1
[DE83-016576] N84-13843

DONOVAN, HAMESTER AND RATTIEN, INC., MCLEAN, VA.
Photovoltaic-cell-reseach priorities
[DE84-000066] N84-13683

DU PONT DE NEMOURS (E. I.) AND CO., AIKEN, S.C.
Calculation of natural convection within a heated enclosure using the method of second moments
[DE84-001596] N84-13517
SRL tethersonde and echosonde data, Anderson Creek Valley, California
[DE84-001680] N84-13715

DUGWAY PROVING GROUND, UTAH.
A vertical wind angle standard deviation calculation method for the unstable surface boundary layer
[AD-A132362] N84-13739

DYNAMICS TECHNOLOGY, INC., TORRANCE, CALIF.
PDF: A computer program for calculation of turbulent combustion utilizing a Probability Density Function (PDF) approach
[DE84-000999] N84-13240
CI: A computer program for calculation of contact indexes which will correct reaction rates evaluated by mean quantities during simulation of turbulent combustion
[DE84-001000] N84-13244
Computation of turbulent reacting flows: Comparison of various mixing/chemistry interaction models
[DE84-000998] N84-13514

E

EARTHQUAKE ENGINEERING RESEARCH INST., BERKELEY, CALIF.
Generalized plastic hinge concepts for 3D beam-column elements
[PB83-247981] N84-13391
Earthquake response considerations of broad liquid storage tanks
[PB83-251215] N84-13393
Inelastic analysis of piping and tubular structures
[PB83-249987] N84-13623

ECOLOGICAL ANALYSTS, INC., SPARKS, MD.
Survey of water quality and flow in Maryland coastal zone streams: A data report
[PB83-249375] N84-13660

EDGERTON, GERMESHAUSEN AND GRIER, INC., IDAHO FALLS, IDAHO.
Tensile and low-cycle fatigue measurements on cross-rolled tungsten at 1505 K
[DE84-000805] N84-13273
Comparison of compression properties and swelling of beryllium irradiated at various temperatures
[DE84-000597] N84-13277
Method of operator splitting or fractional steps and its applications to fluid-dynamic modelling
[DE84-000800] N84-13511
Thermal and hydraulic performance of a sieve-tray direct-contact heat exchanger
[DE84-000663] N84-13531

EDGERTON, GERMESHAUSEN AND GRIER, INC., LAS VEGAS, NEV.
Aerial radiological survey of Area 11, Nevada Test Site
[DE84-000440] N84-13650

ELECTRICITY COUNCIL, LONDON (ENGLAND).
The effect of the structure of metallo-organic complexes on the electrolytic precipitation of titanium and niobium from nonaqueous electrolytes
[BLL-OA-TRANS-3070-(6196.3)] N84-13259
The electrodeposition of titanium coatings
[BLL-OA-TRANS-3057-(6196.3)] N84-13260

ELECTROCHEMICAL TECHNOLOGY CORP., SEATTLE, WASH.
Development of multicomponent transport theory and transport data for membranes in concentrated electrolytes
[DE84-001846] N84-13249

ENGELHARD CORP., MENLO PARK, CALIF.
Develop and test fuel cell powered on-site integrated total energy systems. Phase 3: Full-scale power plant development
[NASA-CR-168294] N84-13672

ENGELHARD INDUSTRIES, INC., EDISON, N.J.
Develop and test fuel cell powered on-site integrated total energy system
[NASA-CR-168239] N84-13673

ENVIRONMENTAL PROTECTION AGENCY, ANN ARBOR, MICH.
Humidity measurement comparison tests: Dew point hygrometer versus wet bulb psychrometer
[PB83-237487] N84-13546

ENVIRONMENTAL PROTECTION AGENCY, CORVALLIS, OREG.
Impact of enhanced solar UV-B radiation upon the marine ecosystem
[PB83-247411] N84-13694

ENVIRONMENTAL PROTECTION AGENCY, GROSSE ILE, MICH.
Dynamic mass balance of PCB (polychlorinated biphenyls) and suspended solids in Saginaw Bay: A case study
[PB83-250308] N84-13699

ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
Performance specifications for continuous monitoring of total reduced sulfur emissions (proposed July 20, 1981, 46 FR 37287), summary of comments and responses
[PB83-251009] N84-13696

ESSEX CORP., HUNTSVILLE, ALA.
Analysis of large space structures assembly: Man/machine assembly analysis
[NASA-CR-3751] N84-13208
EXXON RESEARCH AND ENGINEERING CO., LINDEN, N.J.
Development of a circulating zinc-bromine battery, phase 2
[DE84-001886] N84-13463

F

FACTORY MUTUAL RESEARCH CORP., NORWOOD, MASS.
Automatic sprinklers N84-13346
Fire modeling research at Factory Mutual N84-13370
FEDERAL AVIATION AGENCY, WASHINGTON, D.C.
Census of US civil aircraft
[PB83-252460] N84-13147
FEDERAL COMPILER TESTING CENTER, FALLS CHURCH, VA.
Digital Equipment Corporation, VAX 11/750, VAL-11 COBOL version 2.2 (COBOL technical report)
[PB83-241596] N84-13851
IBM Corporation IBM4341 IBM BASIC release 1.0
[PB82-240945] N84-13852
Datapoint Corporation Datapoint 8800 RMS COBOL 2.3.A
[PB83-240962] N84-13853
Datapoint Corporation, Datapoint 8800, RMS COBOL 2.3.A
[PB83-241075] N84-13854
Northern Telecom, Incorporated NTI-585 ACOBOL/3 release 3
[PB83-241513] N84-13855
FERMI NATIONAL ACCELERATOR LAB., BATAVIA, ILL.
Fermilab satellite refrigerator compressors with the oil-and moisture-removal systems
[DE83-017328] N84-13386
Multiquark exotics
[DE83-017958] N84-13964
Electrical and magnetic properties of the energy-saver correction elements
[DE83-017327] N84-13983
FIRE RESEARCH INST., TOKYO (JAPAN).
Sprinklers N84-13345
Studies of emotional instability in smoke from fires: Decrease of thinking powers and of memory in fire smoke N84-13355
Dependence of evolution of toxic gases on burning conditions N84-13377
FOREST SERVICE, ASHEVILLE, N.C.
The hardwood resource on nonindustrial private forest land in the southeast Piedmont
[PB83-252759] N84-13663
FOREST SERVICE, NEW ORLEANS, LA.
Forest statistics for southwest-north Alabama counties
[PB83-251314] N84-13662
Forest statistics for southwest-south Alabama counties, Forest Service resource bulletin
[PB83-249763] N84-13664
The forest resources of Puerto Rico, Forest Service resource bulletin
[PB83-249995] N84-13665
Forest statistics for southeast Alabama counties, Forest Service resource bulletin
[PB83-250753] N84-13666
Forest statistics for west central Alabama counties, Forest Service resource bulletin
[PB83-249961] N84-13668
FOREST SERVICE, OGDEN, UTAH.
Forest area and timber resource statistcs for state and private lands in New Mexico, 1980, Forest Service resource bulletin
[PB83-251157] N84-13667
FOUNDATION FOR FIRE SAFETY, ROSSLYN, VA.
Smoke inhalation injury N84-13350
FREQUENCY ELECTRONICS, INC., MITCHEL FIELD, N.Y.
Vibration resistant quartz crystal resonators
[AD-A132274] N84-13459

G

GENERAL ATOMIC CO., SAN DIEGO, CALIF.
Low-activation fusion-reactor design studies
[DE83-017688] N84-14014
Chemical vapor deposition of oriented tungsten foils for thermionic cathodes
[AD-A132379] N84-14040
GENERAL ELECTRIC CO., CINCINNATI, OHIO.
Blade loss transient dynamics analysis with flexible bladed disk
[NASA-CR-168176] N84-13193
GENERAL ELECTRIC CO., OAK RIDGE, TENN.
A proposed RF-technology R/D plan for the United States
[DE84-000643] N84-13434
GENERAL ELECTRIC CO., PHILADELPHIA, PA.
Parametric testing and evaluation of a free-piston Stirling engine/linear-compressor system
[DE83-017282] N84-13590
GEO-CENTERS, INC., NEWTON, MASS.
Measurement of friction and wear on modified surfaces
[AD-A132364] N84-13583
GEOLOGICAL SURVEY, ALBANY, N.Y.
Microseismic monitoring for evidence of geothermal heat in the capital district of New York
[PB83-248807] N84-13659
GEOLOGICAL SURVEY, CHAMPAIGN, ILL.
Geology of carbonate aggregate resources of Illinois, Illinois mineral notes
[PB83-251140] N84-13725
GEOLOGICAL SURVEY, DENVER, COLO.
Geology of faults exposed in trenches in Crater Flat, Nye County, Nevada
[DE84-000181] N84-13716
GEOLOGICAL SURVEY, RESTON, VA.
Evaluation of radiometric and geometric characteristics of LANDSAT-D imaging system
[E84-10050] N84-13643
GEORGE WASHINGTON UNIV., WASHINGTON, D.C.
NASA space biology accomplishments, 1982
[NASA-TM-86244] N84-13206
Invariant means on semi-topological transformation semigroups N84-13912
GEORGIA INST. OF TECH., ATLANTA.
A viscous-inviscid interactive procedure for rotational flow in cascades of two dimensional airfoils of arbitrary shape
[NASA-CR-174603] N84-13149
Characterization of high-temperature vapor-phase species and vapor-solid interactions of import to combustion and gasification processes in the energy technologies
[DE83-015166] N84-13242
GEORGIA UNIV., AIKEN, S.C.
Fates and biological effects of polycyclic aromatic hydrocarbons in aquatic systems
[PB83-250191] N84-13698
GEORGIA UNIV., ATHENS.
Comparative assessment of LANDSAT-4 MSS and TM data quality for mapping applications in the southeast
[E84-10040] N84-13633
Splines and the Galerkin method for solving the integral equations of scattering theory
[CSIR-TWISK-267] N84-13873
GLOBAL MARINE DEVELOPMENT, INC., IRVINE, CALIF.
Marine seismic System(MSS) deployment. Phase IV: Investigation of techniques and deployment scenarios for installation of tri-axial seismometer in a borehole in the deep ocean
[AD-A132300] N84-13710
GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
Enhancement of the CAVE computer code
[NASA-CR-3731] N84-13501

H

HAMILTON STANDARD, WINDSOR LOCKS, CONN.
Technology and benefits of aircraft counter rotation propellers
[NASA-CR-168258] N84-13186
HARVARD UNIV., CAMBRIDGE, MASS.
The computer fire codes and required new data N84-13369
Fields and currents and charges on obstacles in a parallel-plate simulator at selected frequencies and with pulse excitation
[AD-A132406] N84-13418
On the interactions of incentive and information structures
[DE83-012084] N84-14065
Surveys of globular cluster and galactic plane X-ray sources N84-14102
HAWAII UNIV., MANOA.
Stream-water storage in the ocean using an impermeable membrane
[PB83-248369] N84-13394
A rectangular gate merged MOSBJT
[AD-A132450] N84-13453
The BJT-JFET: A novel merged device structure
[AD-A132373] N84-13454
Numerical modeling of the MOSBJT
[AD-A132351] N84-13456
Effects of simultaneous phosphorus and arsenic diffusions on emitter push and dislocation generation
[AD-A132331] N84-14042
HEALTH EFFECTS RESEARCH LAB., RESEARCH TRIANGLE PARK, N. C.
Event-related brain potentials: An alternative methodology for neurotoxicological research
[PB83-246116] N84-13775
HELSINKI UNIV. (FINLAND).
The specific solutions of a uniform algebraic differential equation of the second order
[ISSN-0066-1953] N84-13783
On the growth of the spherical derivative of a meromorphic function N84-13785
On the range of real coefficients of functions with bounded boundary rotation N84-13789
On the structure of self-similar fractals N84-13791
Quasiconformal semiflows N84-13792
On the order of quasiregular mappings N84-13793
On the Harnack constant and the boundary behavior of Harnack functions N84-13796
Regular n-gons and Fuchsian groups N84-13798
Twisted sums of nuclear Frechet spaces N84-13800
HELSINKI UNIV. OF TECHNOLOGY, ESPOO (FINLAND).
F-harmonic measure in space N84-13794
Convolution of generalized vector measures N84-13803
HELSINKI UNIV. OF TECHNOLOGY, OTANIEMI (FINLAND).
Range and endurance of jet-engined airplanes at constant altitude
[REPT-83-A1-SER-A] N84-13175
HONEYWELL POWER SOURCES CENTER, HORSHAM, PA.
Safety studies on Li/SOCl-2 reserve battery
[AD-A132279] N84-13458
HUGHES AIRCRAFT CO., CULVER CITY, CALIF.
Lightning mapping sensor study
[NASA-CR-170908] N84-13731
HUGHES RESEARCH LABS., MALIBU, CALIF.
Plasma polymerized high energy density dielectric films for capacitors
[NASA-CR-168233] N84-13310

I

ILLINOIS UNIV., CHICAGO.
Acoustic modelling and analysis of pulsating combustion in a gas-fired pulse burner N84-13921
ILLINOIS UNIV., URBANA.
The mechanics of delamination in fiber-reinforced composite materials. Part 1: Stress singularities and solution structure
[NASA-CR-172269] N84-13221
The mechanics of delamination in fiber-reinforced composite materials. Part 2: Delamination behavior and fracture mechanics parameters
[NASA-CR-172270] N84-13222
FASTBUS diagnostic language users manual, version 3(74)
[DE83-017932] N84-13837
Averaging procedures of multiphase conservation equations
[DE83-014698] N84-13908
CTR plasma engineering studies
[DE84-001279] N84-14006
Research activities that occurred in the Coordinated Science Laboratory for July 1, 1982 through Jun 30, 1983
[AD-A132132] N84-14108
ILLINOIS UNIV., URBANA-CHAMPAIGN.
The FASTBUS segment driver microcode description
[DE83-017972] N84-13437
INDIAN INST. OF TECH., MADRAS.
On the Fatou set of monic polynomials N84-13788
INSTITUTE FOR ADVANCED STUDY, PRINCETON, N.J.
On the structure of self-similar fractals N84-13791
INSTITUTE FOR TELECOMMUNICATION SCIENCES, BOULDER, COLO.
Further investigations of the multiple knife-edge attenuation function
[PB83-245043] N84-13442
INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
Simulation and analysis of low altitude terrestrial satellites
[INPE-2754-PRE/330] N84-13209
L band low noise amplifier project
[INPE-2794-PRE/356] N84-13445
INTAC: A computer-aided test interface
[INPE-2792-TDL/138] N84-13446
Geologic survey in the south-central region of Mato Grosso
[E84-10039] N84-13632

Application of remote sensing to hydrological problems and floods
[E84-10046] N84-13639
Rise in the frequency of cloud cover in LANDSAT data for the period 1973 to 1981
[E84-10047] N84-13640
Interpretation of aeromagnetic anomalies of the Quadrilatero Ferrifero region
[INPE-2897-PRE/416] N84-13707
FORTH: An unconventional programming language
[INPE-2894-PRE/413] N84-13813
Use of an exact penalty function for optimization of discrete problems
[INPE-2769-PRE/342] N84-13883
Study of the optimal control problem solving in the Bolza form by the finite element method
[INPE-2750-PRE/326] N84-13884
Telescope calibration for gamma spectroscopy with a new Ge(Li) diode configuration
[INPE-2885-PRE/407] N84-14083

INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION, OGDEN, UTAH.
Evaluating proposed improvements of public rangelands
[PB83-251124] N84-13669

INTERNAL REVENUE SERVICE, ARLINGTON, VA.
Computer-based training starter kit
[PB83-248615] N84-13780

INTERNATIONAL NICKEL CO., INC., SUFFERN, N. Y.
Oxidation of Inconel alloy MA754 at low oxidation potential
[DE83-017191] N84-13288

IOWA STATE UNIV. OF SCIENCE AND TECHNOLOGY, AMES.
High-sensitivity laser spectroscopy with atoms from a cooled helium jet
[DE84-000614] N84-13554

IOWA UNIV., IOWA CITY.
Observations of nonlinear behavior in a low-pressure discharge column
[AD-A132321] N84-13996

J

JAYCOR, SANTA MONICA, CALIF.
External wave-launcher study
[DE84-001124] N84-13441

JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
The Telecommunications and Data Acquisition Report
[NASA-CR-174610] N84-13401
Orbit determination of highly elliptical Earth orbiters using VLBI and delta VLBI measurements N84-13402
The effects of Reed-Solomon code shortening on the performance of coded telemetry systems N84-13403
Detectors for optical communications: A review N84-13404
Superconducting niobium thin film slow-wave structures N84-13405
VLSI architectures for computing multiplications and inverses in GF(2-m) N84-13406
Deformable subreflector computed by geometric optics N84-13407
An EPROM-based function generator N84-13408
Polynomial driven time base and PN generator N84-13409
RF performance of a proposed L-band antenna system N84-13410
Intercontinental time and frequency transfer using a global positioning system timing receiver N84-13411
NASTRAN structural model for the large 64-meter antenna pedestal. Part 2: Improved model N84-13412
Energy consumption analysis of the Venus Deep Space Station (DSS-13) N84-13413
A study of the charged particle calibration requirements for the Deep Space Network N84-13414
Design issues in the GCF Mark 4 development N84-13415
Results of the Australian geodetic VLBI experiment N84-13416

JOHNSON CONTROLS, INC., MILWAUKEE, WIS.
Research, development and demonstration of lead-acid batteries for electric vehicle propulsion
[DE84-000468] N84-13464

JUNTA DE ENERGIA NUCLEAR, MADRID (SPAIN).
A program for the automatic request of magnetic tapes filing and reading of its contents (processor PCINTA)
[JEN-545] N84-13815
Code BETAL to calculation Alpha/Beta activities in environmental samples
[JEN-549] N84-13816
Recommended values of the humidity correction factor k sub h for determining exposure in an X-ray beam with free-air chambers
[JEN-542] N84-13915

JYVASKYLA UNIV. (FINLAND).
F-harmonic measure in space N84-13794
On quasi-parabolic problems with normal boundary conditions N84-13797

K

KANNER (LEO) ASSOCIATES, REDWOOD CITY, CALIF.
Equations governing the liquid-film flow over a plane with heat flux and interfacial phase change
[DE83-017528] N84-13525

KANSAI UNIV., OSAKA (JAPAN).
Human behavior N84-13351

KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
A simulation study of scene confusion factors in sensing soil moisture from orbital radar
[E84-10042] N84-13635

KARLSRUHE UNIV. (WEST GERMANY).
The specific solutions of a uniform algebraic differential equation of the second order N84-13790

KMS FUSION, INC., ANN ARBOR, MICH.
Simulations and theoretical implications of KMS transport experiments for 1.05 micron and 0.53 micron laser radiation
[DE84-000824] N84-13570
Absolutely unstable stimulated Brillouin scattering and 2-plasmon decay
[DE84-000823] N84-14032

L

LABORATORIO DE ACUSTICA E SONICA, SAO PAULO (BRAZIL).
Techniques of condition monitoring and fault diagnosis in industry N84-13595

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
Traffic alert and collision avoidance system (TCAS): A functional overview of active TCAS I
[AD-A132281] N84-13171
Airborne Intelligent Display (AID) phase 1 software development
[ATC-123] N84-13181
Wideband integrated Voice/Data technology
[AD-A132284] N84-13421
Application of pseudoinversion to linear system identification with discrete measurements
[AD-A132283] N84-13422

LNR COMMUNICATIONS, INC., HAUPPAUGE, N. Y.
The 30 GHz communications satellite low noise receiver
[NASA-CR-168254] N84-13398

LOCKHEED-CALIFORNIA CO., BURBANK.
Flight service evaluation of advanced composite ailerons on the L-1011 transport aircraft
[NASA-CR-172246] N84-13223

LOCKHEED-GEORGIA CO., MARIETTA.
A grid-embedding transonic flow analysis computer program for wing/nacelle configurations
[NASA-CR-166529] N84-13158
A computer program for the calculation of three-dimensional transonic nacelle/inlet flowfields
[NASA-CR-166528] N84-13159

LOCKHEED MISSILES AND SPACE CO., HUNTSVILLE, ALA.
A survey of electric laser codes
[AD-A132352] N84-13551

LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.
Evaluation of selective solar-absorber surfaces, phase 2
[DE84-000067] N84-13685

LOCKHEED MISSILES AND SPACE CO., SUNNYVALE, CALIF.
A preliminary study of solar powdered aircraft and associated power trains
[NASA-CR-3699] N84-13194

LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Physics at the proposed National Underground Science Facility
[DE84-001345] N84-13203
Surface science study of selective ethylene epoxidation catalyzed by the Ag(110) surface: Structural sensitivity
[DE84-001324] N84-13246
Flame fronts with complex chemical networks
[DE84-001175] N84-13255
Low-hysteresis materials for magnetic refrigeration: Gd sub 1-x/Er sub x/Al2
[DE84-001685] N84-13307
Structural performance of ceramics in a high-fluence fusion environment
[DE84-001311] N84-13329
Relaxation in spin glasses: Similarities and differences from ordinary glasses
[DE84-001719] N84-13330
Electrical and thermal modeling of railguns
[DE84-001361] N84-13387
Microwave generators: Oscillating virtual cathodes and reflexing electrons
[DE84-001346] N84-13433
Propagation of a radio-frequency pulsed signal over the Earth. The JOLLY programs
[DE84-000109] N84-13439
Pulsed-power diode generation of high-power microwaves
[DE84-001344] N84-13440
High-Q perpendicular-biased ferrite-tuned cavity
[DE83-017291] N84-13478
Vapor-phase heat-transport system
[DE84-001341] N84-13516
Equations governing the liquid-film flow over a plane with heat flux and interfacial phase change
[DE83-017528] N84-13525
Evidence for a hot electron flux limit in laser-produced plasma experiments
[DE84-001365] N84-13555
Laser-plasma interaction at 10.6 microns
[DE84-001038] N84-13560
Design of a high-brightness, low-jitter, short-pulse laser for plasma diagnostics
[DE84-000129] N84-13564
Approach to single-molecule detection by laser-induced fluorescence
[DE84-001338] N84-13572
Chemical conversion surfaces for solar-energy applications
[DE84-000107] N84-13681
Nevada test site seismic-telemetry measurements
[DE84-000447] N84-13719
Variational method for adaptive grid generation
[DE83-017312] N84-13850
Network file-storage system
[DE84-001068] N84-13863
Remarks on the Kuramoto-Sivashinsky equation
[DE84-001018] N84-13901
PR beam-pulse formation and control
[DE84-001354] N84-13936
Recent developments in the understanding of pion-nucleus scattering
[DE84-001017] N84-13942
Simulation studies on a novel betatron injection scheme
[DE84-001337] N84-13946
Space-time evolution of the nonlinear 2-stream instability
[DE84-001336] N84-13950
ARCHSIM: A proton-synchrotron tracking program, including longitudinal space charge
[DE84-001335] N84-13952
PATH: A lumped-element beam-transport simulation program with space charge
[DE84-001330] N84-13953
Filamentation instability of ion acoustic waves driven by a scattered relativistic beam
[DE84-001323] N84-13956
Simulations of the effects of mobile ions on the relativistic beam-plasma instability for intense beams
[DE84-000369] N84-14003
Energetic plasma-beam propagation in weak and strong magnetic fields
[DE84-001362] N84-14005
High-density Z-pinch research
[DE83-017311] N84-14013
Study on diffusion of the vertical magnetic field in the toroidal stabilizing shell of the ZT-40M reversed-field-pinch device
[DE83-016353] N84-14023
Materials needs for compact fusion reactors
[DE84-001366] N84-14031
Study of defects produced in tungsten by 800-MeV protons using field-ion microscopy
[DE84-001359] N84-14048
Revision of the statistical mechanics of phonons to include phonon line widths
[DE83-017229] N84-14051
Prediction of high-pressure phase transitions in solid N2 and the pressure dependence of the intramolecular vibrational frequencies
[DE83-015260] N84-14057
Review of astrophysical research at Los Alamos
[DE83-017304] N84-14091
Nuclear physics problems for accreting neutron stars
[DE83-017297] N84-14092
Microprobe analyses of rare-earth-element fractionation in meteoritic minerals
[DE83-017326] N84-14097
Inverse comptonization vs. thermal synchrotron
[DE84-001039] N84-14105

M

MANCHESTER UNIV. (ENGLAND).
SISAL: Streams and Iteration in a Single-Assignment Language. Language reference manual, version 1.1
[DE83-016576] N84-13843

MARINE BIOLOGICAL LAB., WOODS HOLE, MASS.
Deforestation measured by LANDSAT: Steps toward a method
[DE83-016645] N84-13652

MARQUARDT CORP., VAN NUYS, CALIF.
Preliminary scramjet design for hypersonic airbreathing missile application
[NASA-CR-3742] N84-13195

MARTIN LUTHER-UNIVERSITAET, HALLE-WITTENBERG (EAST GERMANY).
Quasicon formal extensions, Fredholm eigenvalues, and Grunsky coefficient conditions N84-13804

MARTIN MARIETTA AEROSPACE, DENVER, COLO.
Cell-substrate bonding system design and development
[DE84-000963] N84-13678

MARYLAND UNIV., COLLEGE PARK.
Human behavior N84-13352
The MGM Grand Hotel fire: A case study of human reaction to fire N84-13358
Project People 2: An extended interview study of behavior response patterns in health care facility fire incidents N84-13359
The quantum hall effect N84-14036

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Structures and properties of rapidly solidified 9Cr-1Mo steel
[DE84-001276] N84-13276
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 3. A model for the effect of titanium addition
[DE84-001296] N84-13281
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 2. Dual-ion irradiations
[DE84-001297] N84-13282
Irradiation response in titanium-modified austenitic stainless steels prepared by rapid-solidification processing. Part 1: Microstructural response to neutron irradiation
[DE84-001298] N84-13283
Asymptotic optimality of shortest path routing
[AD-A132280] N84-13423
Wafer-scale integration of systolic arrays
[AD-A132536] N84-13450
Miniaturized disk bend tests of neutron-irradiated path A type alloys
[DE84-001277] N84-13618
Planar embedding of planar graphs
[AD-A132538] N84-13820
Impossibility of distributed consensus with one faulty process
[AD-A132503] N84-13823
Issues in the design and implementation of Act2
[AD-A132326] N84-13826
Adaptive spectral smoothing
[AD-A132574] N84-13887
PLY: A system of plausibility inference with a probabilistic basis
[AD-A132537] N84-13889
Concurrency control for resilient nested transactions
[AD-A132501] N84-13891
On bisecting random graphs
[AD-A132500] N84-13892
Hydrogen pellet injection into Alcator C
[DE83-016878] N84-14018
Plasma/neutral gas transport in divertors and limiters
[DE84-001594] N84-14034
Principles of superionic conduction
[DE84-001215] N84-14044

MASSACHUSETTS UNIV., AMHERST.
Radiolysis of resist polymers. 2: Poly(haloalkylmethacrylates) and copolymers with methylmethacrylate
[AD-A132095] N84-13321

MCDONNELL AIRCRAFT CO., ST. LOUIS, MO.
Processing science for AS/3501-6 carbon/epoxy composites
[AD-A132323] N84-13316

MCDONNELL-DOUGLAS RESEARCH LABS., ST. LOUIS, MO.
Aging of polymeric materials
[AD-A132250] N84-13318

MECHANICAL TECHNOLOGY, INC., LATHAM, N. Y.
Stirling-engine heat-actuated heat pump
[DE83-017137] N84-13529

MICHIGAN STATE UNIV., EAST LANSING.
Photo interpretation key to Michigan land cover/use
[E84-10048] N84-13641

MICHIGAN STATE UNIV., HICKORY CORNERS.
Dissolved organic matter and lake metabolism: Biochemistry and controls of nutrient flux dynamics in lakes
[DE83-016789] N84-13761

MICHIGAN UNIV., ANN ARBOR.
Slippery versus slip resistant work surfaces: The background for a regulatory definition
[PB83-243634] N84-13392
Reflection and identification studies applied to terrain imaging radar
[AD-A132401] N84-13419
Quasiconformal semiflows N84-13792
The Crab Nebula: A theoretical and observational study N84-14074
Studies of cataclysmic variables N84-14084
Extragalactic emission-line objects and the Michigan-Tololo survey N84-14101

MIDWEST RESEARCH INST., GOLDEN, COLO.
Experimental study of three-dimensional natural convection at high Rayleigh number
[DE83-011982] N84-13530
Design analysis of advanced photovoltaic technologies
[DE84-000008] N84-13675
Matrix approach to testing mirrors, part 2
[DE83-011996] N84-13676
County-level wind resource estimates for DOE Region 5
[DE84-000009] N84-13744
Yields photosynthetic efficiencies, and proximate chemical composition of dense cultures of marine microalgae, a subcontract report
[DE83-011992] N84-13757
Analysis and modeling of photosynthetic bacterial hydrogen production plants
[DE84-000003] N84-13758

MINNESOTA UNIV., MINNEAPOLIS.
Positive ion-molecule reactions in OCS/hydrocarbon mixtures
[AD-A132350] N84-13237
Quasiconformal mappings with free boundary components N84-13801
Scheduling supercomputers
[AD-A132512] N84-13822
Study of plasma chemistry and plasma processing
[AD-A132207] N84-13997
Far infrared studies on superconductors and heat-capacity studies on liquid crystals
[DE84-001105] N84-14046

MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.
A fully vectorized numerical solution of the incompressible Navier-Stokes equations
[NASA-CR-174496] N84-13491

MONSANTO RESEARCH CORP., MIAMISBURG, OHIO.
Component temperature versus laser-welding parameters
[DE84-000362] N84-13559

MOUND LAB., MIAMISBURG, OHIO.
Characterization of glass-filled engineering thermoplastic composites
[DE84-000361] N84-13231

N

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Separated isotopes: Vital tools for science and medicine
[DE83-011646] N84-13981

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Aeronautical Engineering, a continuing bibliography with indexes
[NASA-SP-7037(168)] N84-13136
Aeronautical Engineering: A continuing bibliography with indexes (supplement 167)
[NASA-SP-7037(167)] N84-13137
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(09)] N84-13204
NASA space biology accomplishments, 1982
[NASA-TM-86244] N84-13206
Propagation effects on satellite systems at frequencies below 10 GHz, a handbook for satellite systems design, 1st edition
[NASA-RP-1108] N84-13397
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 251)
[NASA-SP-7011(251)] N84-13767

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
Rotor systems research aircraft: Fixed-wing simulations results
[NASA-TM-85863] N84-13176
Flight testing the Rotor Systems Research Aircraft (RSRA)
[NASA-TM-85852] N84-13177
Preliminary results of the first static calibration of the RSRA helicopter active-isolator rotor balance system
[NASA-TM-84395] N84-13178
Flight test and analyses of the B-1 structural mode control system at supersonic flight conditions
[NASA-CR-170405] N84-13197
Flight-test of the glide-slope track and flare-control laws for an automatic landing system for a powered-lift STOL airplane
[NASA-TP-2128] N84-13198
Solution of Poisson equations for 3-dimensional grid generations
[NASA-TM-85857] N84-13886
Baffle system employing reflective surfaces
[NASA-TM-84406] N84-13985
Origin and evolution of the Saturn system
[NASA-TM-85847] N84-14096

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Analysis of multispectral scanner (MSS) and Thematic Mapper (TM) performance (pre-launch and post-launch)
[E84-10043] N84-13636
Postglacial rebound observed by Lageos and the effective viscosity of the lower mantle
[NASA-TM-84982] N84-13705
Rain estimation from satellites: An examination of the Griffith-Woodley technique
[NASA-TM-84969] N84-13735
Soft X-ray spectral observations of quasars and high X-ray luminosity Seyfert galaxies
[NASA-TM-85118] N84-14082
Characteristics of gamma-ray line flares
[NASA-CR-174608] N84-14098
Cosmic ray antimatter and baryon symmetric cosmology
[NASA-TM-83958] N84-14103

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
An overview of aerodynamic research and technology requirements as related to some military needs
[NASA-TM-85691] N84-13138
Some thoughts concerning large load-carrying vehicles
[NASA-TM-85701] N84-13139
XTRAN2L: A program for solving the general-frequency unsteady transonic small disturbance equation
[NASA-TM-85723] N84-13150
Tabulation of data from tests of an NPL 9510 airfoil in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TM-84579] N84-13151
Investigation of installation effects on twin-engine convergent-divergent nozzles
[NASA-TP-2205] N84-13152
Vortex flap flow reattachment line and subsonic longitudinal aerodynamic data on 50 deg to 74 deg Delta wings on common fuselage
[NASA-TM-84618] N84-13160
Internal pressure distributions for a two-dimensional thrust-reversing nozzle operating at a free-stream Mach number of zero
[NASA-TM-85655] N84-13161
Aerodynamic force measurements with a train-gage balance in a cryogenic wind tunnel
[NASA-TP-2251] N84-13162
Thrust-induced effects on subsonic longitudinal aerodynamic characteristics of a vectored-engine-over-wing configuration
[NASA-TP-2228] N84-13163
Aerodynamic characteristics, including effect of body shape, of a Mach 6 aircraft concept
[NASA-TP-2235] N84-13164
Effect of thrust reverser operation on the lateral-directional characteristics of a three-surface F-15 model at transonic speeds
[NASA-TP-2234] N84-13165
Comparison of low-altitude wind-shear statistics derived from measured and proposed standard wind profiles
[NASA-TM-85668] N84-13172
Simulator study of pilot-aircraft-display system response obtained with a three-dimensional-box pictorial display
[NASA-TP-2122] N84-13182
Characterization of the general purpose research furnace for low-G directional solidification experiments
[NASA-TM-85718] N84-13211

Cobalt ion-containing epoxies
[NASA-TM-85715] N84-13309
An application of nonlinear programming to the design of regulators of a linear-quadratic formulation
[NASA-CR-17253] N84-13380
Complex eigenvalues for the stability of Couette flow
[NASA-CR-172251] N84-13492
Embedded cavity drag in steady and unsteady flows
[NASA-CR-172275] N84-13493
The disturbance flow field produced by an evolving vortex
[NASA-TP-2245] N84-13500
Pressure system recertification at NASA-Langley Research Center
[NASA-TM-85733] N84-13576
Stability, vibration and passive damping of partially restrained imperfect columns
[NASA-TM-85697] N84-13608
Restricted maximum principles for elastic bodies
[NASA-CR-172255] N84-13609
Theoretical basis for design of thermal-stress-free fasteners
[NASA-TP-2226] N84-13614
Proceedings of a Workshop on Assessment of Techniques for Measuring Tropospheric N sub x O sub y
[NASA-CP-2292] N84-13706
Kinematic equations for resolved-rate control of an industrial robot arm
[NASA-TM-85685] N84-13866
The compressible aerodynamics of rotating blades based on an acoustic formulation
[NASA-TP-2197] N84-13923
A simple model of space radiation damage in GaAs solar cells
[NASA-TP-2242] N84-13978

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.

A real-time implementation of an advanced sensor failure detection, isolation, and accommodation algorithm
[NASA-TM-83553] N84-13140
Performance degradation of a typical twin engine commuter type aircraft in measured natural icing conditions
[NASA-TM-83564] N84-13173
Flame radiation and liner heat transfer in a tubular-can combustor
[NASA-TM-83538] N84-13188
Three-dimensional viscous design methodology for advanced technology aircraft supersonic inlet systems
[NASA-TM-83556] N84-13190
INHYD: Computer code for intraply hybrid composite design. A users manual
[NASA-TP-2239] N84-13224
Replacing critical and strategic refractory metal elements in nickel-base superalloys
[NASA-TM-83528] N84-13264
Microwave monolithic integrated circuit development for future spaceborne phased array antennas
[NASA-TM-83518] N84-13399
A system for the simulation and evaluation of satellite communication networks
[NASA-TM-83531] N84-13400
Computation of viscous flow in curved ducts and comparison with experimental data
[NASA-TM-83548] N84-13494
Measurement of rolling friction by a damped oscillator
[NASA-TP-2257] N84-13577
An improved finite-difference analysis of uncoupled vibrations of tapered cantilever beams
[NASA-TM-83495] N84-13610
MOD-2 wind turbine development
[NASA-TM-83460] N84-13670
PREWATE: An interactive preprocessing computer code to the Weight Analysis of Turbine Engines (WATE) computer code
[NASA-TM-83545] N84-13812
Acceleration of convergence of vector sequences
[NASA-TP-2193] N84-13885
On some flow characteristics of conventional and excited jets
[NASA-TM-83503] N84-13922
Inverted velocity profile semi-annular nozzle jet exhaust noise experiments
[NASA-TM-83525] N84-13924
Research and technology, 1983
[NASA-TM-83540] N84-14061

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.

Potential means of support for materials processing in space. A history of government support for new technology
[NASA-TM-82554] N84-13205
Galvanic coupling between D6AC steel, 6061-T6 aluminum, Inconel 718 and graphite-epoxy composite material: Corrosion occurrence and prevention
[NASA-TP-2236] N84-13263
Coil planet centrifugation as a means for small particle separation
[NASA-TM-82561] N84-13756
The Marshall Space Flight Center Low-Energy Ion Facility: A preliminary report
[NASA-TM-82559] N84-13933

NATIONAL AEROSPACE LAB., TOKYO (JAPAN).

An approximate method of estimating the aerodynamic interference between two parallel bodies (normal force and side force)
[NAL-TR-752] N84-13154
A new operation method for a large-scale shock tunnel
[NAL-TR-765] N84-13200
A study of air breathing rockets. 3: Supersonic mode combustors
[NAL-TR-756] N84-13213
New relationships for turbulent plumes
[NAL-TR-763] N84-13495
Tensile strength of pressureless-sintered silicon nitride at elevated temperature
[NAL-TR-753] N84-13611
Strain analysis of thin composites with Moire method
[NAL-TR-754] N84-13612
Some grid generations using conformal mapping
[NAL-TR-758] N84-13871
Grid generation for cascades using conformal mapping
[NAL-TR-760] N84-13872

NATIONAL BUILDING RESEARCH INST., PRETORIA (SOUTH AFRICA).

High alumina cement concrete
[CSIR-BRR-573] N84-13311
An analysis of cloud cover at Johannesburg, Cape Town and Durban, in South Africa
[CSIR-NBRI-SR-BOU-60] N84-13734

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.

Thermodynamic surface for water: The formulation and computer programs
[PB83-249789] N84-13256
Fire investigation N84-13344
Building systems and smoke control N84-13348
Recent US progress in fire growth modeling N84-13354
Emergency evacuation flow models N84-13360
Escape and rescue model N84-13361
Measuring evacuation difficulty N84-13363
Recent progress at NBS in fire growth modeling N84-13372
Study of biological samples obtained from victims of MGM Grand Hotel fire N84-13374
Lateral-torsional response of structures subjected to seismic waves
[PB83-239582] N84-13390
Programmer's manual for the fire safety evaluation system cost minimizer computer program
[PB83-251447] N84-13395
Proceedings of the 3rd LAN-Transport Workshop. Report of the third workshop for local area network implementors of the NBS specifications of the International Standards Organization transport class 4 protocol: Special interest group on file transfer protocol
[PB83-251348] N84-13657
Size of letters required for visibility as a function of viewing distance and observer visual acuity
[PB83-250589] N84-13782
Specification and interpretation of data model semantics: An integration of two approaches
[PB83-249714] N84-13856
Proceedings of the Third LAN-Transport Workshop. Report of the Third Workshop for Local Area Network Implementors of the NBS Specifications of the International Standards Organization Transport Class 4 Protocol Special Interest Group on File Transfer Protocol
[PB83-251348] N84-13857

NATIONAL ELECTRICAL ENGINEERING RESEARCH INST., PRETORIA (SOUTH AFRICA).

The 1980 International Aerospace Conference on Lightning and Static Electricity
[CSIR-ELEK-249] N84-13733

NATIONAL GEOPHYSICAL AND SOLAR-TERRESTRIAL DATA CENTER, BOULDER, COLO.

Natural hazards photograph catalog, key to geophysical records documentation no. 20
[PB83-250415] N84-13674

NATIONAL INST. FOR AERONAUTICS AND SYSTEMS TECHNOLOGY, PRETORIA (SOUTH AFRICA).

An analytical method to calculate the flow field about blunt bodies of revolution at incidence in supersonic free stream flow
[CSIR-NIAST-82/72] N84-13156
Phase locked loop theory and application: A precis paper
[CSIR-NIAST-82/57] N84-13444

NATIONAL INST. FOR PERSONNEL RESEARCH, JOHANNESBURG (SOUTH AFRICA).

The programming and validation of the computerised version of the intermediate mental alertness test
[CSIR-PERS-303] N84-13776
Women at work and stress
[R/PERS-626] N84-13777

NATIONAL INST. FOR TRANSPORT AND ROAD RESEARCH, PRETORIA (SOUTH AFRICA).

Hazardous location identification by computer
[CSIR-TR-RF/6/81] N84-13814

NATIONAL MECHANICAL ENGINEERING RESEARCH INST., PRETORIA (SOUTH AFRICA).

Hydraulic hoisting and backfilling
[CSIR-ME-452] N84-13498
Instruction manual for the use of the CSIR triaxial rock stress measuring equipment
[CSIR-ME-1763] N84-13535

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.

Glaciological data: Permafrost. A bibliography, 1978 - 1982
[PB83-249730] N84-13724
Acoustic-gravity wave dispersion relations in a baroclinic atmosphere
[PB83-248690] N84-13726
A survey of underwater-acoustic ray tracing techniques
[PB83-250522] N84-13931

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SEATTLE, WASH.

A satellite study of ocean internal waves
[PB83-248708] N84-13661
Winter currents on the eastern Bering Sea shelf
[PB83-248823] N84-13753

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.

Satellite activities of NOAA (National Environmental Satellite Data and Information Service) 1982
[PB83-252510] N84-13747
Economic benefits of operational environmental satellites
[PB83-252932] N84-13748

NATIONAL PHYSICAL RESEARCH LAB., PRETORIA (SOUTH AFRICA).

Spectrographic investigation of gold by Grimm lamp
[CSIR-SR-283] N84-13233

NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA (ONTARIO).

Effective-width model for evacuation flow N84-13362

NATIONAL RESEARCH INST. FOR MATHEMATICAL SCIENCES, PRETORIA (SOUTH AFRICA).

Interacting weights in multiple attribute decision making
[CSIR-TWISK-270] N84-13874
The linear hierarchical model and its application in the econometric analysis
[CSIR-TWISK-274] N84-13875
Generalized composite integration rules in the presence of a singularity
[CSIR-TWISK-272] N84-13876
Estimation of the Manova eigenvalues under the random effects model
[CSIR-TWISK-271] N84-13877
A Numerov-Galerkin technique applied to a finite element shallow-water equations model with enforced conservation of integral invariants and selective lumping
[CSIR-TWISK-276] N84-13878
Selecting a subset of regression variables so as to maximize the prediction accuracy at a specified point
[CSIR-TWISK-275] N84-13903

NATIONAL RESEARCH INST. FOR OCEANOLOGY, STELLENBOSCH (SOUTH AFRICA).

The nature and analysis of random waves in shallow water. Part 1: Text and figures
[CSIR-RR-388/1-PT-1] N84-13496
The nature and analysis of random waves in shallow water. Part 2: Appendices
[CSIR-RR-388/2-PT-2] N84-13497
Investigation of the generation of regular waves by a sliding valve pneumatic wave generator
[CSIF-RR-553] N84-13579
NRIO microcomputer system
[CSIR-T/SEA-8134] N84-13805
An interdisciplinary oceanographic database
[CSIR-T/SEA-8207] N84-14064

NATIONAL TRANSPORTATION SAFETY BOARD, WASHINGTON, D. C.

Aircraft accident report - United Airlines Flight 2885, N8053U, McDonnell Douglas DC-8-54F, Detroit, Michigan, January 11, 1983
[PB83-910407] N84-13168

Aircraft accident report - A. E. Staley Manufacturing Company, Inc., Canadair Challenger CL-600, N805C, Hailey, Idaho, January 3, 1983
[PB83-910405] N84-13169

NATIONAL WEATHER SERVICE, SALT LAKE CITY, UTAH.
Stratified maximum temperature relationships between sixteen zone stations in Arizona and respective key stations
[PB83-249904] N84-13746

NATURAL ENVIRONMENT RESEARCH COUNCIL, LONDON (ENGLAND).
The use of thematic mapper data for land cover discrimination: Preliminary results from the UK SATMaP programme
[E84-10038] N84-13631

NATURAL ENVIRONMENT RESEARCH COUNCIL, SWINDON (ENGLAND).
The United Kingdom SATMaP program
[E84-10002] N84-13627

NAVAL AEROSPACE MEDICAL RESEARCH LAB., PENSACOLA, FLA.
The effects of character stroke width on the visibility of a head-coupled display
[AD-A132046] N84-13183

NAVAL AIR TEST CENTER, PATUXENT RIVER, MD.
Crash Position Indicator/Crash Survivable Flight Data Recorder ejectable versus nonejectable
[AD-A132329] N84-13184

NAVAL OCEAN RESEARCH AND DEVELOPMENT ACTIVITY, BAY ST. LOUIS, MISS.
A position paper: Mesoscale oceanography from GEOSAT
[AD-A132292] N84-13749

NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.
Technology assessment: 1983 forecast of future test technology requirements
[AD-A132421] N84-14107

NAVAL OCEANOGRAPHIC OFFICE, BAY ST. LOUIS, MISS.
Multivariate, minimum-curvature splines for randomly spaced data
[AD-A132319] N84-13899

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
An experimental investigation into the forebody and engine inlet airflow characteristics of a photographic reconnaissance window pallet on the RF/A-18 aircraft
[AD-A132271] N84-13167
Helicopter vertical stabilizer design considerations
[AD-A132308] N84-13180
A microcomputer program package of the USAF stability and control DATCOM
[AD-A132143] N84-13199
A gas turbine combustor test facility for fuel composition investigations
[AD-A132479] N84-13201
An experimental investigation of soot behavior in a gas turbine combustor
[AD-A132210] N84-13202
Characterization of the structure and substructure of thermally transformation cycled Cu-Zn-Al shape memory alloys
[AD-A132341] N84-13270
Thermomechanical processing of M-50 steel
[AD-A132272] N84-13271
Signal processor interface simulation of the AN/SPY-1A radar controller
[AD-A132170] N84-13429
An experimental evaluation of the thermal performance of a rotating heat pipe with internal axial fins
[AD-A132553] N84-13504
Measurement of velocity distributions in turbulent jets using a laser Doppler velocimeter
[AD-A132316] N84-13508
Condensation heat transfer of steam on a single horizontal tube
[AD-A132245] N84-13508
An analysis of smooth and axially finned, rotating heat pipe condensers
[AD-A132141] N84-13509
Probabilistic fatigue life predictions of structural components in high-cycle fatigue regimes
[AD-A132425] N84-13615
The effects of environment and dwell on high temperature fatigue crack growth of 2 1/4 Cr - 1 Mo steel
[AD-A132147] N84-13617
An analysis of pC-3 micropulsion in the geomagnetic field
[AD-A132443] N84-13709
Quasi-Lagrangian diagnostics applied to an extratropical explosive cyclogenesis in the North Pacific
[AD-A132213] N84-13741
Baroclinic Rossby wave signature in a general circulation ocean model
[AD-A132219] N84-13750
Ocean mixing and circulation response in the marginal ice zone
[AD-A132174] N84-13751
Design and implementation of a BASIC cross-compiler and virtual memory management system for the TI-59 programmable calculator
[AD-A132172] N84-13808
The design of backtrack algorithms
[AD-A132299] N84-13828
Model Statement Language/analyzer (MSL/MSA): A top-down Problem Statement Language/analyzer (PSL/PSA) approach for the user dialogue in decision support systems
[AD-A132273] N84-13829
Utilization of Ada as a program design language
[AD-A132244] N84-13830
A user's guide to ARSPIC: The univariate time series analysis program for autoregressive spectral information quantile identification
[AD-A132217] N84-13831
Automated design of microprocessor-based digital filters
[AD-A132214] N84-13832
Development of a GIFTS (graphics-oriented interactive finite-element time-sharing system) plotting package compatible with either PLOT10 or IBM/DSM graphics
[AD-A132195] N84-13833
Benchmarking the join operations of relational database machines
[AD-A132312] N84-13861
Logic design of a shared disk system in a multi-micro computer environment
[AD-A132165] N84-13862
Artificial intelligence techniques for industrial applications in job shop scheduling
[AD-A132164] N84-13867
An introduction to the parabolic equation for acoustic propagation
[AD-A132315] N84-13925
Calculation of atmospheric transmittance by IBM 3033 computer code LOWTRAN IIIB
[AD-A132123] N84-13989
The effect of condensate inundation on steam condensation heat transfer to wire-wrapped tubing
[AD-A132175] N84-14060
Knowledge base management for model management systems
[AD-A132211] N84-14062

NAVAL RESEARCH LAB., WASHINGTON, D. C.
Algorithms for single-signal and multisignal minimum-cross-entropy spectrum analysis
[AD-A132400] N84-13420
On a relation between Maximum-Likelihood classification and Minimum-Cross-Entropy classification
[AD-A132237] N84-13426
A compact optical pulse compressor with computer-generated holographic masks for radar applications
[AD-A132152] N84-13430
Decoupling ion efficiency from impedance in pulsed power diodes
[DE83-018114] N84-13470
Theoretical modeling of the plasma-erosion opening switch for inductive-storage applications
[DE84-001843] N84-13483
Pseudospectral solution of inviscid flows with multiple discontinuities
[AD-A132084] N84-13510
Analysis of stability and symmetry implications for ICF
[DE84-000640] N84-13556
Vortex shedding and laser ablation
[DE84-000301] N84-13565
Real-time processing system for the NRL (Naval Research Laboratory) remote sensing experiment: Phelps Bank, July 1982
[AD-A132151] N84-13645
Data validation and summary for the NRL remote sensing experiment: Phelps Bank, July, 1982. Part 2: Meteorology
[AD-A132105] N84-13646
Computed survey spectra of 2-5 micron atmospheric absorption
[AD-A132526] N84-13708
Multisignal Minimum-Cross-Entropy spectrum analysis weighted priors
[AD-A132358] N84-13896
Optimum depth of propagation in shallow water
[AD-A132182] N84-13927
Optical properties of the marine aerosol as predicted by a BASIC version of the Navy aerosol model
[AD-A132411] N84-13986

NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.
High altitude aerodynamic tests with simulated heat-shield outgassing
[AD-A132078] N84-13227
Shock induced molecular excitation in solids
[AD-A132236] N84-13935

NAVAL UNDERWATER SYSTEMS CENTER, NEW LONDON, CONN.
Mathematical models of nonlinear galvanic polarization
[AD-A132403] N84-13895

NEBRASKA UNIV., LINCOLN.
Satellite observations of variations in southern hemisphere snow cover
[PB83-252908] N84-13745

NEVADA UNIV., RENO.
Development of design hyetographs for southern Nevada
[DE84-001227] N84-13649

NEVADA UNIV. SYSTEM, RENO.
Parametric model for peak flow prediction in ungaged ephemeral watersheds
[PB83-249698] N84-13658

NEW MEXICO INST. OF MINING AND TECHNOLOGY, SOCORRO.
Study of defects produced in tungsten by 800-MeV protons using field-ion microscopy
[DE84-001359] N84-14048

NEW MEXICO STATE UNIV., LAS CRUCES.
The transient response of circular foil heat-flux gages
[DE83-017785] N84-13541

NEW MEXICO UNIV., ALBUQUERQUE.
Theoretical studies of oxygen-iodine laser mechanisms and new laser concepts
[AD-A132374] N84-13550
The effects of hyperbaric elemental gases on the rate coefficient of K(+) influx in mammalian synaptosomes
N84-13754

NEW YORK ACADEMY OF SCIENCES, N. Y.
Proceedings of the 4th International Conference on Physicochemical Hydrodynamics
[DE83-012765] N84-13532

NIELSEN ENGINEERING AND RESEARCH, INC., MOUNTAIN VIEW, CALIF.
Triservice program for extending missile aerodynamic data base and prediction program using rational modeling
[AD-A132455] N84-13166

NORTHWESTERN UNIV., EVANSTON, ILL.
The measurement of elastic constants for the determination of stresses by X-rays
[AD-A132330] N84-13897
Determining stresses in the presence of nonlinearities in interplanar spacing versus Sin squared Psi
[AD-A132365] N84-14041

O

OAK RIDGE GASEOUS DIFFUSION PLANT, TENN.
ANALYSIS/PLOT: A graphics package for use with the SORT/ANALYSIS data bases
[DE83-017886] N84-13847

OAK RIDGE NATIONAL LAB., TENN.
In-situ photoacoustic spectrometry for corrosion studies
[DE84-001994] N84-13254
Effect of phosphorus on the swelling and precipitation behavior of austenitic stainless steels during irradiation
[DE84-000412] N84-13275
Effect of implanted helium on the microstructure and creep properties of ordered (Fe0.49 Ni0.51)V-3 alloys
[DE84-000691] N84-13278
Modeling binary-alloy solidification processes: Numerical implementation
[DE84-001587] N84-13284
Microstructure of 9 Cr-1 MoVNb steel irradiated to 40 dpa at elevated temperatures in HFIR
[DE84-000339] N84-13285
Electrochemical etching of titanium-alloy castings
[DE84-000244] N84-13286
Oxidation of Inconel alloy MA754 at low oxidation potential
[DE83-017191] N84-13288
Mass transfer behavior of a modified austenitic stainless steel in lithium
[DE84-000338] N84-13293
A comparison of the irradiated tensile properties of a high-manganese austenitic steel and type 316 stainless steel
[DE84-000260] N84-13294
Diffusivities of hydrogen in yttrium and yttrium alloys
[DE84-000411] N84-13296

Low-cycle fatigue behavior of oxygen-free high-conductivity copper at 3000C in high vacuum
[DE84-000725] N84-13305
Segregation and domain structure in rapidly solidified Ni3Al
[DE83-017188] N84-13306
Models of simultaneous heat and moisture transfer in soils
[DE84-001580] N84-13513
Oak Ridge heat-pump models. Part 1. A steady-state computer design model for air-to-air heat pumps
[DE84-001577] N84-13519
Performance test results of an absorption heat pump which is designed to utilize low-temperature 600C (1400F) industrial waste heat
[DE83-017194] N84-13533
Stirling engine patents: International patent inventory
[DE84-002378] N84-13592
Solution of groundwater-flow equations using an orthogonal finite-element scheme
[DE84-000690] N84-13648
Update of pulsed-laser processing technology for high-efficiency silicon solar cells
[DE84-000638] N84-13684
Calibration of laboratory bioassays with results from microcosms and ponds
[DE83-017224] N84-13692
Atmospheric retention of anthropogenic CO2: Scenario dependence of the airborne fraction
[DE83-016854] N84-13723
Nuclear-medicine
[DE84-000346] N84-13759
Chemical and physical characterization of the activation of ribulosebiphosphate carboxylase/oxygenase
[DE83-017226] N84-13764
Short introduction to office applications of markup language
[DE83-011400] N84-13844
Analysis-plot generation code with significance levels computed using Kolmogorov-Smirnov statistics valid for both large and small samples
[DE84-001581] N84-13907
Algorithm for computing significance levels using the Kolmogorov-Smirnov statistic and valid for both large and small samples
[DE84-001586] N84-13909
Ambipolarity and transport with resonant ion diffusion in EBT
[DE84-000333] N84-14000
Experimental results on finite-beta limits and transport in the ISX-B Tokamak
[DE84-000258] N84-14001
A practical sublimation source for large-scale chromium gettering in fusion devices
[DE84-000724] N84-14002
Ion-beam surface analysis in plasma-edge studies
[DE84-001578] N84-14004
Inverse plasma equilibria
[DE84-000723] N84-14008
Electron-drift velocity and ionization and attachment coefficients in gases/mixtures for diffuse-discharge opening switches
[DE83-017206] N84-14017
Background information and technical basis for assessment of environmental implications of magnetic fusion energy
[DE83-018300] N84-14030
Solid-State Division
[DE84-000296] N84-14045
Neutron-scattering studies of magnetic superconductors
[DE84-000393] N84-14054
Standard format for data films
[DE84-000345] N84-14068

OAK RIDGE Y-12 PLANT, TENN.
Dilatometric investigation of phase-transformation kinetics in HP 9-4-20 steel
[DE84-001180] N84-13280
Low-cycle fatigue behavior of oxygen-free high-conductivity copper at 3000C in high vacuum
[DE84-000725] N84-13305

OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, PARIS (FRANCE).
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-4, 209/July-August 1982
[ESA-TT-781] N84-13141
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-5, 210/September-October 1982
[ESA-TT-785] N84-13142
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-2, 207/March-April 1982
[ESA-TT-759] N84-13143
Bifurcation theory applied to the study of control losses on combat aircraft N84-13144
Analysis of pressure distributions on a wing with an oscillating trailing edge flap in subsonic and transonic flow N84-13145
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-6, 211/November-Decemter 1982
[ESA-TT-801] N84-13382
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1982-3, 208/May-June 1982
[ESA-TT-771] N84-13916

OFFICE OF NAVAL RESEARCH, LONDON (ENGLAND).
Fiber composite materials research in the UK: Assessment report
[AD-A132386] N84-13226
International Meeting on Lithium Batteries
[AD-A132371] N84-13455
The 1982 International Congress of Photographic Science
[AD-A132372] N84-13536
Fourth Europhysical Conference on Lattice Defects in Ionic Crystals
[AD-A132387] N84-14039

OFFICE OF SOFTWARE DEVELOPMENT, FALLS CHURCH, VA.
Hewlett Packard HP 3000 series 40, COBOL 11/3000 version A.00.09
[PB83-254805] N84-13858
Hewlett Packard HP 3000 series 40, COBOL 11/3000 version A.00.09 (COBOL technical report)
[PB83-254813] N84-13859

OHIO STATE UNIV., COLUMBUS.
Adaptive array behavior with periodic phase modulated interference
[AD-A132229] N84-13427
An experimental study of multi-link models of human postural dynamics and control N84-13769

OKLAHOMA STATE UNIV., STILLWATER.
Processor-controlled DAC-20 (digital-to-analog converter)
[AD-A132260] N84-13460
Surface contact wear and abrasive wear in lubricated sliding mechanisms N84-13573

OLD DOMINION UNIV., NORFOLK, VA.
Turbulent wall pressure simulation
[AD-A132297] N84-13507

ORANGE FREE STATE UNIV., BLOEMFONTEIN (SOUTH AFRICA).
Various solutions in multiple Bayesian's decision and multinormal estimation problems
[TR-78] N84-13882
A predictive view of the detection of influential observations in Gmanova
[CSIR-TR-83] N84-13904
Asymptotic null and nonnull distributions of three multivariate test statistics in Gmanova
[TR-82] N84-13905

OREGON UNIV., EUGENE.
Liouvillian Green's-function theory of spectral line shape
[AD-A132467] N84-13894

OVERSEAS RELATIONS BRANCH TRANSLATION SERVICE, LONDON (ENGLAND).
Investigation of the possibilities for the electrodeposition of titanium from non-aqueous solutions
[BLL-OA-TRANS-3069-(6196.3)] N84-13267
Current state of titanium coating methods
[BLL-OA-TRANS-3067-(6196.3)] N84-13268
The effect of water on the dielectric performance of a cable
[BLL-OA-TRANS-2634-(6196.3)] N84-13447
Service experience of EDF 20 kV XLPe insulated cable
[BLL-OA-TRANS-2633-(6196.3)] N84-13448
Temperature rise of handles and knobs
[BLL-OA-TRANS-3047-(6196.3)] N84-13502
Radial thermomechanical behaviour
[BLL-OA-TRANS-2639-(6196.3)] N84-13503

OXFORD UNIV. (ENGLAND).
Convolution of generalized vector measures N84-13803

P

PACIFIC NORTHWEST LAB., RICHLAND, WASH.
Grain boundary segregation and environmental degradation of a ferritic stainless steel
[DE83-016927] N84-13289
Modeling crack-growth processes in fusion-reactor materials
[DE84-000477] N84-13291
Radiation-induced phosphorus segregation in austenitic and ferritic alloys
[DE84-000903] N84-13302
Dislocation/obstacle interactions during low-dose irradiation creep of nickel
[DE84-001416] N84-13303
Pulsed-ion-irradiated microstructures in molybdenum
[DE84-000679] N84-13304
Relationships between strength, electrical conductivity, and density for oxidized PGX graphite
[DE83-016184] N84-13325
Physical modeling of the champagne effect
[DE84-001813] N84-13388
A guide for effluent radiological measurements at DOE installations
[DE83-016639] N84-13542
Atomic-beam density determination from laser-induced fluorescence interval distributions
[DE84-000677] N84-13571
Transport assessment: Arid task. Model verification studies
[DE84-000121] N84-13653
Mobility of organic complexes of nickel and cobalt in soils
[DE83-017897] N84-13720
Use of fauna as biomonitors
[DE83-016082] N84-13762
Life histories and monitoring strategies: Some lessons from field experience
[DE83-016164] N84-13763
Developing computer-graphics programs for specialized applications
[DE83-016181] N84-13836
Double beta decay: Recent developments and projections
[DE84-000476] N84-13944
Radiation hardening of oxygen-doped niobium by 14-MeV neutrons
[DE84-000103] N84-14026
Management and display of data analysis environments for large data sets
[DE84-001414] N84-14069

PAN AMERICAN UNIV., EDINBURG, TEX.
Seasonal soybean crop reflectance
[E84-10049] N84-13642

PATTERN ANALYSIS AND RECOGNITION CORP., NEW HARTFORD, N.Y.
Advanced pattern recognition
[AD-A132339] N84-13987

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
A theoretical and experimental study of turbulent particle-laden jets
[NASA-CR-168293] N84-13187
White light signal processing with the application to spread spectrum communications
[AD-A132418] N84-13417
Targeted basic studies of ferroelectric and ferroelastic materials for piezoelectric transducer applications
[AD-A132136] N84-13461
Studies of ions in a drift field: Laser diagnostics of excited states and measurements of thermochemical properties at equilibrium
[DE84-000363] N84-13562
Development of a technique for short-term prediction of hydrometeors using advection and physical forcing
[AD-A132259] N84-13740
Physiological responses of normotensives and essential hypertensives to exercise in the heat N84-13768
Introduction: Advances and opportunities in cluster research
[DE84-000364] N84-13917
Targeted basic studies of ferroelectric and ferroelastic materials for piezoelectric transducer applications
[AD-A132262] N84-14043
A very large array 1411 MHz radio survey: Properties of complete samples of radio and optically selected QSO candidates in a high galactic-latitude field N84-14076

PHYSICS INTERNATIONAL CO., SAN LEANDRO, CALIF.
Scientific program and abstracts
[DE83-017620] N84-13967

PITTSBURGH UNIV., PA.
The design and implementation of debugging systems for languages with advanced control structures N84-13811
A comparative study of the factors linking psychology and information science N84-14063
A study of the empirical mass-luminosity diagram for early type stars N84-14075

PRC SYSTEMS SERVICES CO., MCLEAN, VA.
County-level wind resource estimates for DOE Region 5
[DE84-000009] N84-13744

PRINCETON RESOURCES, INC., N. J.
Evaluation of non-intrusive flow measurement techniques for a re-entry flight experiment
[NASA-CR-172142] N84-13212

PRINCETON UNIV., N. J.
Ionization equilibrium in isolated H 2 regions N84-14086

PULSE SCIENCES, INC., SAN LEANDRO, CALIF.
Low-inductance, dual-feed diode development
[DE84-000117] N84-13465
PURDUE UNIV., LAFAYETTE, IND.
Mechanisms of elevated-temperature rupture in single-phase ceramics
[DE83-017779] N84-13327
A rotary vane open reversed Brayton cycle air conditioning and refrigeration system N84-13574
LANDSAT 4 image data quality analysis
[E84-10036] N84-13629
On the singularities of certain nonlinear partial differential equations N84-13787
Photo-induced field emissions from metallic surfaces
[DE84-000872] N84-13966

R

RANGE COMMANDERS COUNCIL, WHITE SANDS MISSILE RANGE, N. MEX.
Range reference atmosphere 0-70 km altitude
[AD-A132487] N84-13737
White Sands Missile Range, New Mexico Range reference atmosphere 0-70 km altitude
[AD-A132471] N84-13738
READING UNIV. (ENGLAND).
The United Kingdom SATMaP program
[E84-10002] N84-13627
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
Physical modeling of the champagne effect
[DE84-001813] N84-13388
Generating three-dimensional surface models of solid objects from multiple projections
[AD-A132392] N84-13824
RICE UNIV., HOUSTON, TEX.
Prediction of multicomponent liquid-mixture viscosity from binary thermodynamic data
[DE83-011934] N84-13524
Cognitive components underlying the digit symbol test
[PB83-250464] N84-13779
Self-consistent magnetosphere for a static aligned rotator N84-14085
ROCHESTER UNIV. N. Y.
Four frames suffice. A provisionary model of vision and space
[AD-A132359] N84-13825
Advanced Hough transform implementations
[AD-A132522] N84-13890
Two-dimensional accretion disk structure and stability N84-14090
ROCKWELL INTERNATIONAL CORP., CALIF.
Space reactor system and subsystem investigations: Assessment of technology issues for the reactor and shield subsystem, SP-100 Program
[DE84-001566] N84-13979
Space-reactor system and subsystem investigations: Cost and schedule estimates for reactor and shield subsystems technology development. SP-100 program
[DE84-000112] N84-13984
Comparison of measured and calculated helium production in nickel using newly evaluated neutron cross sections for (59)Ni
[DE84-000565] N84-14035
ROCKWELL INTERNATIONAL CORP., THOUSAND OAKS, CALIF.
Low-power radiation-hard GaAs RAM
[AD-A132325] N84-13457
Detection of closed internal fatigue cracks
[DE83-017686] N84-13620
ROME AIR DEVELOPMENT CENTER, HANSCOM AFB, MASS.
Nulling with limited degrees of freedom
[AD-A132276] N84-13424
ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH (ENGLAND).
Relationship between the glass transition temperature and the chemical structure of polymers
[RAE-TRANS-2098] N84-13312
Extrusion. State of the art and development, review paper
[RAE-TRANS-2102] N84-13381

S

SALZBURG UNIV. (AUSTRIA)
On some extensions of a theorem of Hardy and Littlewood N84-13784
SANDIA LABS., ALBUQUERQUE, N. MEX.
Quantitative determination of the intensities of known components in spectra obtained from surface analytical techniques
[DE84-000926] N84-13239
Fluidized-bed and salt-bath heat treating (AISI 4130 and 4340 alloy steels)
[DE84-000979] N84-13290
Measurement of thermal conductivity from high-temperature pulse diffusivity and calorimetry measurements
[DE84-000353] N84-13297
Finite-element analysis of an epoxy-curing process
[DE84-000452] N84-13323
Automated thermal conductivity probe and applications to powders
[DE84-000451] N84-13328
Low-inductance, dual-feed diode development
[DE84-000117] N84-13465
Superregenerative amplifier in linear mode as a radar range gate-derivations
[DE84-000978] N84-13474
ESD evaluation of radiation-hardened, high-reliability CMOS and MNOS ICs
[DE84-000138] N84-13481
Use of numerical heat-transfer techniques to analyze thermal-comparator conductivity measurements
[DE84-000945] N84-13515
Construction and verification of a finite-element method for noniasothermal flows in porous media
[DE83-017158] N84-13522
Particle velocity measurements in laser irradiated foils using ORVIS
[DE83-016629] N84-13563
Thermal modeling of laser welding with a quasi-1-dimensional approach
[DE84-001292] N84-13585
Sizing defects using annular-array techniques with an automated ultrasonic data-acquisition system
[DE84-001644] N84-13597
Alternative shock characterizations for consistent shock-test specification
[DE84-000482] N84-13619
Structural analysis of a glass/space frame parabolic-trough solar collector for various operating positions
[DE84-001137] N84-13622
Seismic investigation of the Multi-Well Experiment site
[DE84-000943] N84-13655
Photovoltaic concentrators: Recent developments
[DE84-001641] N84-13687
Stress-wave experiments on selected crustal rocks and minerals
[DE84-001613] N84-13714
Computerized art plotting system. Volume 1: Horizontal bar charts (second edition)
[DE83-018113] N84-13839
User's guide to Sandia TEX
[DE83-016763] N84-13840
Portable FORTRAN contour-plotting subprogram
[DE83-017422] N84-13846
Direct measurement of the energy spectrum of an intense proton beam
[DE84-000457] N84-13939
Thomson-scattering measurements of electron temperature and density in a plasma channel created by a relativistic electron beam
[DE84-000356] N84-13940
Tomographic technique in relativistic electron beam experiments
[DE84-000357] N84-13949
Proto-I axial-focusing experiments
[DE84-000458] N84-13951
IBEX: Annular beam propagation experiment
[DE84-000456] N84-13954
Origin of electron-bombardment enhanced reactivity of graphite with hydrogen
[DE83-017561] N84-13960
Grad-B drift transport of high current electron beams
[DE84-000115] N84-13977
Analysis of mechanisms for anode plasma formation in ion diodes
[DE83-017793] N84-14010
Overview of ion-diode research
[DE83-017791] N84-14012
Hybrid ion diode theory and computations
[DE84-000102] N84-14029
Steady-state hydrogen transport in solids exposed to fusion-reactor plasmas. Part 3: Applications of theory
[DE84-001646] N84-14033
SCHAFER (W. J.) ASSOCIATES, INC., WAKEFIELD, MASS.
Assessment of the adequacy of US accelerator technology for Department of Energy Missions
[DE84-001632] N84-13945
SCHOOL OF AEROSPACE MEDICINE, BROOKS AFB, TEX.
Decompression procedures for flying after diving, and diving at altitudes above sea level
[AD-A132039] N84-13771
SCIENCE APPLICATIONS, INC., BOULDER, COLO.
Electron-cyclotron maser and whistler instabilities in a relativistic electron plasma with loss-cone distribution
[DE84-001607] N84-13561
Resonant-3-wave mode coupling in inhomogeneous plasmas: Symmetry breaking by omega meson-*
[DE84-001633] N84-13999
Locally omnigenous tandem-mirror design
[DE84-001605] N84-14007
SCIENCE APPLICATIONS, INC., LA JOLLA, CALIF.
d-d Tokamak reactor assessment
[DE83-016127] N84-14019
SCRIPPS INSTITUTION OF OCEANOGRAPHY, SAN DIEGO, CALIF.
Yields photosynthetic efficiencies, and proximate chemical composition of dense cultures of marine microalgae, a subcontract report
[DE83-011992] N84-13757
SEIKEI UNIV., TOKYO (JAPAN).
Scaling laws on fire spread N84-13368
SHIRLEY (JEFF W.), COLUMBIA, S.C.
Hybrid space heating/cooling system with Trombe wall, underground venting, and assisted heat pump
[DE84-000406] N84-13686
SIGMA RESEARCH, INC., RICHLAND, WASH.
Representativeness of meteorological observations
[DE83-017699] N84-13743
SINGLETON MATERIALS ENGINEERING LABS., KNOXVILLE, TENN.
Testing of epoxy-phenolic coating for lining carbon steel pipe
[DE84-90073] N84-13322
SONOMA TECHNOLOGY, INC., SANTA CRUZ, CALIF.
Characterization of reactants, reaction mechanisms and reaction products leading to extreme acid rain and acid aerosol conditions in southern California
[PB83-252825] N84-13697
SOUTHAMPTON UNIV. (ENGLAND).
The dynamic in plane response at the centre of a rotating elastic disc due to oscillatory in plane forces at the rim
[ISVR-TR-121] N84-13613
SOUTHERN RESEARCH INST., BIRMINGHAM, ALA.
Mathematical model of electrostatic precipitation for the Texas Instruments Programmable 59 calculator
[PB83-261669] N84-13695
SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.
Intumescent reaction mechanisms: An analytic model
[AD-A132586] N84-13225
Investigation of sources, properties and preparation of distillate test fuels
[NASA-CR-168227] N84-13332
Middle distillate fuel stability characteristics: A review
[AD-A132156] N84-13337
Alternative fuels for medium-speed diesel engines (AFFMSDE) program: Slurries, emulsions, and blended-fuel extenders; cylinder wear measurements, staged injection
[DE84-000524] N84-13340
STANFORD LINEAR ACCELERATOR CENTER, CALIF.
Cryogenic testing of the TPC superconducting solenoid
[DE84-000528] N84-13467
Ideal of the perfect magnet-superconducting systems
[DE83-015080] N84-13482
Toward a constructive physics
[DE83-016644] N84-13919
Motion of ionized electrons under the intense electromagnetic field of the beam
[DE84-001396] N84-13955
Theoretical perspectives on strange physics
[DE83-018085] N84-13965
The e+e- collisions in the multi-TeV region
[DE84-000993] N84-13968
Physics with polarized beams in e+e(-) colliders
[DE83-016441] N84-13976
New heavy-ion-fusion accelerator research program
[DE83-014898] N84-14016
Surface properties of metal-nitride and metal-carbide films deposited on Nb for RF superconductivity
[DE84-001491] N84-14055
STANFORD UNIV., CALIF.
Analytical model of rotor wake aerodynamics in ground effect
[NASA-CR-166533] N84-13157
High energy efficient solid state laser sources
[NASA-CR-174606] N84-13548
External versus intuitive reasoning: The conjunction fallacy in probability judgment
[AD-A131801] N84-13778
The amplitude density function and high-resolution frequency analysis of time series
[AD-A132466] N84-13906
Preparation of infrared optic fibers using new materials
[AD-A132311] N84-13988

STATE UNIV. OF NEW YORK, STONY BROOK.
On interpolation methods for boundary value ordinary differential equations N84-13869
Self-consistent spherical accretion and models of quasars N84-14088
STATE UNIV. OF NEW YORK AT BUFFALO, AMHERST.
Multiple steady states of buoyancy induced flow in cold water and their stability N84-13487
SUN DESIGNS, GLEN MOORE, PA.
Flat-plate solar-collector performance data base and user's manual
[DE83-011993] N84-13682
SYSTEMS AND APPLIED SCIENCES CORP., SILVER SPRING, MD.
The use of linear feature detection to investigate thematic mapper data performance and processing
[E84-10037] N84-13630

T

TECHNION - ISRAEL INST. OF TECH., HAIFA.
On the effect of gyroscopic forces on the instability of certain fluid-elastic systems. Part 1: Definitions
[PUBL-340] N84-13499
TECHNISCHE UNIV., BERLIN (WEST GERMANY).
On Fuchsian groups of accessible type N84-13795
TECHNOLOGY, INC., SAN ANTONIO, TEX.
Stress assessment through voice analysis
[AD-A132577] N84-13773
TEL-AVIV UNIV. (ISRAEL).
Some double-valued representations of the linear groups
[DE84-001525] N84-13913
TELEDYNE ENERGY SYSTEMS, TIMONIUM, MD.
Development of electrolysis-cell separator for 1250C operation. Advanced alkaline electrolysis cell development
[DE84-000439] N84-13484
TEMPLE UNIV., PHILADELPHIA, PA.
Dynamic aspects of the dye-sensitized photoconductivity of semiconductors
[DE84-001132] N84-14059
TENNESSEE TECHNOLOGICAL UNIV., COOKEVILLE.
Design and evaluation of small water turbines
[DE84-000404] N84-13586
TENNESSEE UNIV., KNOXVILLE.
An analysis of the interaction between a submerged jet and a receiver-diffuser in a reverse-flow diverter
[DE83-012593] N84-13521
TENNESSEE UNIV. SPACE INST., TULLAHOMA.
Statistical analysis of turbulence data from the NASA Marshall Space Flight Center atmospheric boundary layer tower array facility
[NASA-CR-3737] N84-13730
TEXAS A&M UNIV., COLLEGE STATION.
Laser-induced fluorescence line narrowing in atomic vapors
[DE83-018216] N84-13558
The influence of convective activity on the vorticity budget
[NASA-CR-3752] N84-13736
Time series long memory identification and quantile spectral analysis
[AD-A132240] N84-13900
TEXAS UNIV., AUSTIN.
Detection of cracks on highway pavements
[PB83-238204] N84-13389
Finite-element analysis of incompressible laminar and turbulent flow with heat transfer
[DE84-000042] N84-13523
Early mechanisms in radiation-induced biological damage
[DE84-001511] N84-13765
Energetic-particle stabilization of ballooning modes in Tokamaks
[DE83-016205] N84-14020
Hamiltonian formulation of reduced magnetohydrodynamics
[DE83-016758] N84-14021
Variational theory of RF-driven currents
[DE83-016745] N84-14022
Nonlinear kinetic theory of a single helicity tearing instability
[DE84-000049] N84-14024
Linear relativistic gyrokinetic equation in general magnetically confined plasmas
[DE84-000048] N84-14027
Do pions condense in neutron-star matter?
[DE84-000463] N84-14093
Loop coalescence in flares and coronal X-ray brightening
[DE83-013070] N84-14099
THERMO ELECTRON CORP., WALTHAM, MASS.
Design and development of a high-concentration and high-effieciency photovoltaic concentrator using a curved Fresnel lens
[DE84-000967] N84-13679
TOKYO FIRE DEPT. (JAPAN).
Effect of carbon monoxide (CO) on firefighters N84-13357
TOKYO METROPOLITAN UNIV. (JAPAN).
Functions of uniformly bounded characteristic N84-13802
TOKYO UNIV. (JAPAN).
Current researches on fire retardant materials in Japan N84-13342
Recent Japanese progress in fire modeling N84-13353
Modeling of compartment fires N84-13364
New modeling of compartment fires and problem of flashover N84-13365
Response of flame spread phenomena to ambient air stream velocity changes N84-13373
TOLEDO UNIV., OHIO.
Numerical simulation of two-dimensional heat transfer in composite bodies with application to de-icing of aircraft components
[NASA-CR-168283] N84-13490
TRW SPACE TECHNOLOGY LABS., REDONDO BEACH, CALIF.
Lightning mapper sensor design study
[NASA-CR-170909] N84-13732

U

UNION CARBIDE CORP., OAK RIDGE, TENN.
Response of the North American corn belt to climate warming, CO2
[DE83-017873] N84-13721
UNIVERSITY OF NORTHERN ILLINOIS, DE KALB.
Tools for the creation of IMS database designs from Entity-Relationship diagrams
[DE84-000592] N84-14066
UNIVERSITY OF SOUTHERN MISSISSIPPI, HATTIESBURG.
Improved polymers for enhanced-oil-recovery synthesis and rheology
[DE83-017371] N84-13324
UTAH STATE UNIV., LOGAN.
Wave and particle observations associated with the beam plasma discharge in a space simulation chamber N84-13210

V

VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
Perturbation methods for slightly damped gyroscopic systems N84-13534
Continued research on selected parameters to minimize community annoyance from airport noise
[NASA-CR-174607] N84-13688
Solution of the 2-point boundary value problems of optimal spacecraft rotational maneuvers N84-13870

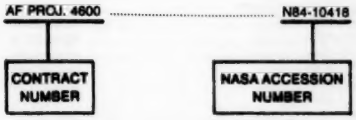
W

WARSAW UNIV. (POLAND).
On L sup p-integrability in PDE's and quasiregular mappings for large exponents N84-13799
WASHINGTON STATE UNIV., PULLMAN.
Fracto-emission from polymers
[AD-A132462] N84-13314
WASHINGTON UNIV., SEATTLE.
Investigation of axisymmetric confined turbulent jet mixing in the near region with adverse pressure gradient N84-13148
Reverse combustion along constant geometry fissures in heterogeneous fuels N84-13232
A composite analysis of a tropical squall-line system N84-13727
Precipitation development in midlatitude cyclones: A study of cloud structures and processes N84-13728
A numerical study of cloud and precipitation processes in mesoscale rainbands N84-13729
An abundance analysis of the cool barium stars N84-14087
Baroclinic waves in the atmosphere of Mars: Observations, linear instability, and finite-amplitude evolution N84-14094
WEIZMANN INST. OF SCIENCE, REHOVOTH (ISRAEL).
Multiquark exotics
[DE83-017958] N84-13964
WESTECH SYSTEMS, INC., PHOENIX, ARIZ.
Microgravity silicon zoning investigation
[NASA-CR-170919] N84-13207
WESTINGHOUSE DEFENSE AND ELECTRONIC SYSTEMS CENTER, BALTIMORE, MD.
MM and T: Ceramic metal substrates for hybrid electronics
[AD-A132514] N84-13313
WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER, PITTSBURGH, PA.
Void-free epoxy castings for cryogenic insulators and seals
[DE83-017273] N84-13479
WISCONSIN UNIV., MADISON.
Analytical investigation of meso-scale boundary layer forced by surface temperature variation in a stratified sheared atmosphere N84-13702
WITWATERSRAND UNIV., JOHANNESBURG (SOUTH AFRICA).
Biaxial fatigue, a review of the literature
[FRP-82/17] N84-13266
WRIGHT STATE UNIV., DAYTON, OHIO.
Investigation of the dynamics and threshold behavior of endothermic negative ion-neutral reactions
[DE84-001369] N84-13975

Y

YOKOHAMA MUNICIPAL UNIV. (JAPAN).
Physiological function of combustion gas and especially that of CN N84-13376

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

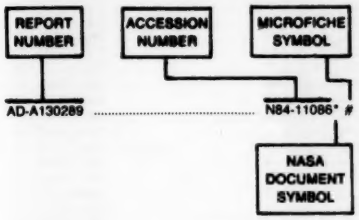
AF PROJ 2304 ..... N84-13596
AF PROJ. LD16 ..... N84-13417
AF PROJ. 3T10 ..... N84-13421
AF PROJ. 2301 ..... N84-13935
AF PROJ. 2304 ..... N84-13898
AF PROJ. 2313 ..... N84-13770
AF PROJ. 2418 ..... N84-13272
AF PROJ. 2531 ..... N84-13827
AF PROJ. 3048 ..... N84-13319
N84-13336
AF PROJ. 3326 ..... N84-13550
AF PROJ. 3763 ..... N84-13418
AF PROJ. 4594 ..... N84-13987
AF PROJ. 4600 ..... N84-13424
AF PROJ. 6670 ..... N84-13740
AF PROJ. 6690 ..... N84-13713
AF PROJ. 7659 ..... N84-13460
AF PROJ. 7670 ..... N84-13712
AF PROJ. 7719 ..... N84-13773
AF PROJ. 7930 ..... N84-13771
AF-AFOSR-0030-80 ..... N84-13298
N84-13299
AF-AFOSR-0122-81 ..... N84-13898
AF-AFOSR-0122-812 ..... N84-13596
ARPA ORDER 3045 ..... N84-13423
ARPA ORDER 3673 ..... N84-13421
ARPA ORDER 3829 ..... N84-13817
ARPA ORDER 4042 ..... N84-13710
ARPA ORDER 4100 ..... N84-13457
ARPA ORDER 4550 ..... N84-14038
AT-(0-4-3)-34 ..... N84-13971
DA PROJ. 1E1-62777-A-878 ..... N84-13179
DA PROJ. 1L1-61122-AH-60 ..... N84-13238
DA PROJ. 1L1-62705-AH-94 ..... N84-13459
DA PROJ. 1L1-62715-A-042 ..... N84-13893
DA PROJ. 1L7-63702-DG-11 ..... N84-13196
DA PROJ. 1T1-61102-AH-51 ..... N84-13337
DA PROJ. 1T1-61102-BH-57 ..... N84-13320
DAAE07-83-M-R028 ..... N84-13582
DAAG29-79-C-0155 ..... N84-13823
DAAG29-83-K-0051 ..... N84-13831
N84-13900
DAAH01-80-C-1289 ..... N84-13551
DAAK20-79-C-0272 ..... N84-13459
DAAK21-80-G-0076 ..... N84-13313
DAAK30-79-C-0045 ..... N84-13581
DAAK70-81-C-0128 ..... N84-13338
DAAK70-82-C-0001 ..... N84-13337
DAAK70-82-C-0100 ..... N84-13419
DAJA37-81-C-0214 ..... N84-13320
DCA100-82-C-0061 ..... N84-13431
N84-13432
DE-AC01-78CS-54266 ..... N84-13340
DE-AC01-80RA-50418 ..... N84-14065
DE-AC01-82ER-30029 ..... N84-13683
DE-AC01-82ER-40075 ..... N84-13945
DE-AC02-76CH-00016 ..... N84-13298
N84-13299
N84-13300
N84-13383
N84-13385
N84-13476
N84-13477
N84-13484
N84-13539
N84-13760
N84-13963
N84-13969
N84-13974
N84-13982
N84-14050
N84-14056
N84-14058
DE-AC02-76CH-03000 ..... N84-13386
N84-13983
DE-AC02-76CH-03073 ..... N84-14027
DE-AC02-76ER-01195 ..... N84-13437
N84-13837
DE-AC02-76ET-52040 ..... N84-14006
DE-AC02-76EV-01599 ..... N84-13761
DE-AC02-77CH-00178 ..... N84-13530
N84-13675
N84-13676
N84-13682
N84-13744
N84-13757
N84-13758
DE-AC02-77EV-04361 ..... N84-13937
DE-AC02-78ER-10107 ..... N84-13276
N84-13281
N84-13282
N84-13283
N84-13618
DE-AC02-78ET-51013 ..... N84-14018
N84-14034
DE-AC02-79ER-10461 ..... N84-14046
DE-AC02-79ER-10464 ..... N84-13966
DE-AC02-79ER-10496 ..... N84-13554
DE-AC02-80ER-10591 ..... N84-13327
DE-AC02-80ER-10668 ..... N84-13975
DE-AC02-80EV-10468 ..... N84-13652
DE-AC02-81ER-10881 ..... N84-14059
DE-AC02-81ER-10948 ..... N84-13591
DE-AC02-82ER-60055 ..... N84-13582
N84-13917
DE-AC02-83CH-10140 ..... N84-13651
DE-AC02-83ER-40096 ..... N84-13554
DE-AC03-75SF-00515 ..... N84-13955
DE-AC03-76ET-53057 ..... N84-13561
N84-13999
N84-14007
DE-AC03-76SF-00098 ..... N84-13245
N84-13248
N84-13249
N84-13250
N84-13251
N84-13253
N84-13274
N84-13384
N84-13462
N84-13467
N84-13468
N84-13475
N84-13520
N84-13538
N84-13540
N84-13680
N84-13943
N84-13948
N84-13961
N84-13973
N84-13994
N84-14044
N84-14049
DE-AC03-76SF-00515 ..... N84-13467
N84-13482
N84-13919
N84-13968
N84-13976
N84-14016
N84-14055
DE-AC03-81ER-10964 ..... N84-13240
N84-13244
N84-13514
DE-AC03-81ER-53113 ..... N84-14019
DE-AC03-82ER-52083 ..... N84-13441
DE-AC04-76DP-00053 ..... N84-13231
N84-13559
DE-AC04-76DP-00613 ..... N84-13229
N84-13331
N84-13544
N84-13545
N84-13842
DE-AC04-76DP-00789 ..... N84-13290
N84-13297
N84-13328
N84-13463
N84-13465
N84-13473
N84-13474
N84-13481
N84-13515
N84-13522
N84-13523
N84-13541
N84-13563
N84-13585
N84-13597
N84-13619
N84-13622
N84-13655
N84-13678
N84-13679
N84-13687
N84-13714
N84-13839
N84-13840
N84-13846
N84-13939
N84-13940
N84-13949
N84-13951
N84-13954
N84-13960
N84-13977
N84-14010
N84-14012
N84-14029
N84-14033
DE-AC04-78CS-15361 ..... N84-13685
DE-AC05-76ET-53036 ..... N84-14022
DE-AC06-76RL-01830 ..... N84-13289
N84-13291
N84-13302
N84-13303
N84-13304
N84-13325
N84-13388
N84-13542
N84-13571
N84-13651
N84-13653
N84-13720
N84-13752
N84-13762
N84-13763
N84-13836
N84-13944
N84-14026
N84-14069
DE-AC07-76ID-01570 ..... N84-13273
N84-13511
N84-13531
DE-AC08-81DP-40156 ..... N84-14025
DE-AC08-81NV-10162 ..... N84-13649
DE-AC08-82DP-40152 ..... N84-13570
N84-14032
DE-AC08-83NV-10282 ..... N84-13650
DE-AC09-76SR-00001 ..... N84-13517
N84-13715
DE-AC13-76GJ-01664 ..... N84-13647
DE-AC19-80BC-10114 ..... N84-13587
DE-AC21-81MC-16537 ..... N84-13242
DE-AI01-77CS-51044 ..... N84-14071
DE-AI01-77DP-40042 ..... N84-13556
N84-13565
DE-AI01-79ET-20305 ..... N84-13670

DE-AI01-80ET-17088 ..... N84-13672
N84-13673
DE-AI05-76EV-03688 ..... N84-13743
DE-AI08-78ET-44802 ..... N84-13716
DE-AI08-79DP-40092 ..... N84-13470
N84-13483
DE-AM03-76SF-00034 ..... N84-13766
DE-AS05-76ER-03992 ..... N84-13913
N84-14093
DE-AS05-76EV-03408 ..... N84-13765
DE-AS05-78ET-10747 ..... N84-13301
DE-AS05-80ER-10578 ..... N84-13558
DE-AS05-82ER-13008 ..... N84-13524
DE-AS19-80BC-10321 ..... N84-13324
DE-AT03-76ER-70185 ..... N84-13766
DE-AT03-76ER-70217 ..... N84-13971
DE-AT03-76ER-71013 ..... N84-13243
DE-AT03-76ET-51011 ..... N84-14014
DE-AT03-82SF-11687 ..... N84-13979
N84-13984
DE-FG02-82ER-12020 ..... N84-13532
DE-FG05-80ET-53068 ..... N84-14020
N84-14021
N84-14024
N84-14027
N84-14099
DE-FG44-80R4-10224 ..... N84-13686
DE-FG44-80R4-10243 ..... N84-13586
DE-FG44-81R-410435 ..... N84-13677
DE-FG97-80ET-46630 ..... N84-13654
DEN3-189 ..... N84-14071
DEN3-241 ..... N84-13672
N84-13673
DI-12-14-50001-38 ..... N84-13637
DI-14-34-0001-0232 ..... N84-13658
DI-14-34-0001-2101 ..... N84-13257
DI-14-34-0001-9262 ..... N84-13394
DI-1434-0001-2113 ..... N84-13394
DOT-FA72WAI-817 ..... N84-13171
DOT-FA77WAI-817 ..... N84-13181
EC-77-C-01-4042 ..... N84-13675
EG-77-C-01-4042 ..... N84-13530
N84-13676
N84-13744
N84-13757
N84-13758
EPA-R-805318 ..... N84-13774
EPA-68-02-2683 ..... N84-13695
EPRI PROJ. TPS-81-817 ..... N84-13723
EY-76-S-02-1599 ..... N84-13761
EY-76-S-03-0034 ..... N84-13971
E00014-82-F-0094 ..... N84-14047
FG01-81ER-10984 ..... N84-13981
F04701-82-C-0083 ..... N84-13428
F19628-80-C-0002 ..... N84-13181
N84-13421
N84-13422
F19628-81-C-0079 ..... N84-13460
F19628-81-K-0038 ..... N84-13417
F19628-82-K-0023 ..... N84-13740
F29601-81-K-0010 ..... N84-13418
F29601-82-K-0017 ..... N84-13550
F30602-80-C-0319 ..... N84-13987
F30602-81-C-0213 ..... N84-13827
F33615-80-C-0018 ..... N84-13773
F33615-81-K-0014 ..... N84-13770
F59551697 ..... N84-13986
JPL-956249 ..... N84-13397
J0094 ..... N84-13227
KC-04-02-01 ..... N84-13255
MDA903-80-C-0155 ..... N84-13817
MDA903-82-C-0348 ..... N84-14038
MDA903-83-C-0067 ..... N84-13457
NAGW-92 ..... N84-14098
NAG1-182 ..... N84-13548
NAG1-286 ..... N84-13221
N84-13222
NAG1-304 ..... N84-13607
NAG3-72 ..... N84-13490
NAG3-131 ..... N84-13189
NAG3-190 ..... N84-13187
NAMRL PROJ. M0096 ..... N84-13183
NASA ORDER S-10772-C N84-13628
NASA ORDER S-12407-C N84-13643
NASA ORDER S-98091-B N84-13634
NASW-3165 ..... N84-13206
NAS1-15069 ..... N84-13223
NAS1-15367 ..... N84-13501
NAS1-15434 ..... N84-13195
NAS1-16740 ..... N84-13153
NAS1-16975 ..... N84-13194
NAS1-16978 ..... N84-13781
NAS1-17070 ..... N84-13380
N84-13492
N84-13609
NAS1-17130 ..... N84-13493
NAS2-11285 ..... N84-13158
N84-13159
NAS3-22494 ..... N84-13398
NAS3-22783 ..... N84-13332
NAS3-22828 ..... N84-13310
NAS3-23043 ..... N84-13186
NAS3-23248 ..... N84-13218
NAS3-23280 ..... N84-13443
NAS3-23281 ..... N84-13193
NAS3-23289 ..... N84-13265
NAS3-23606 ..... N84-13885
NAS4-2932 ..... N84-13197
NAS5-26859 ..... N84-13629
NAS5-27382 ..... N84-13637
N84-13638
NAS5-27393 ..... N84-13630
NAS7-100 ..... N84-13397
NAS8-32989 ..... N84-13208
NAS8-33776 ..... N84-13736
NAS8-34627 ..... N84-13730
NAS8-34920 ..... N84-13207
NAS8-34941 ..... N84-13732
NAS8-34942 ..... N84-13731
NAS9-16151 ..... N84-13671
NBS-G7-9011 ..... N84-13369
NCC1-64 ..... N84-13212
NCC9-6 ..... N84-13635
NGL-05-002-105 ..... N84-13704
NGL-05-020-272 ..... N84-14098
NGL-23-004-083 ..... N84-13641
NIH-GM-13557 ..... N84-13765
NIH-RR-00886 ..... N84-13765
NR PROJ. 036-106 ..... N84-13269
NR PROJ. 036-163 ..... N84-13895
NR PROJ. 048-667 ..... N84-13892
NR PROJ. 049-189 ..... N84-13891
NR PROJ. 049-456 ..... N84-13823
NR PROJ. 394-055 ..... N84-13894
NR PROJ. 657-694 ..... N84-13507
NSF ATM-82-12791 ..... N84-13722
NSF CEE-81-05790 ..... N84-13308
N84-13391
N84-13623
NSF CPE-81-15163 ..... N84-13189
NSF DMR-82-16972 ..... N84-13897
N84-14041
NSF MCS-80-12907 ..... N84-13820
NSF MCS-81-20839 ..... N84-13492
NSF MCS-82-02056 ..... N84-13255
NSF PHY-79-21336 ..... N84-13554
NSF PHY-82-09562 ..... N84-13944
NSG-25-001-055 ..... N84-13491
NSG-1598-SUPPL-3 ..... N84-13688
NSG-2400 ..... N84-13157
NSG-3160 ..... N84-13885
NSG-3260 ..... N84-13149
NSG-9033 ..... N84-13642
N01-HL-1-4136 ..... N84-13774
N00014-75-C-0196 ..... N84-13616
N00014-75-C-0555 ..... N84-13887
N00014-75-C-0612 ..... N84-14108
N00014-75-C-0661 ..... N84-13889
N84-13891
N00014-75-C-0673 ..... N84-14098
N00014-75-C-0799 ..... N84-13269
N00014-75-C-1183 ..... N84-13423
N00014-76-C-0139 ..... N84-13580
N84-13821
N00014-76-C-0475 ..... N84-13906
N00014-76-C-0476 ..... N84-13998
N00014-76-C-1081 ..... N84-13453
N84-13454
N84-13456
N84-14042
N00014-78-C-0164 ..... N84-13825
N84-13890
N00014-78-C-0291 ..... N84-13461
N84-14043
N00014-79-C-0077 ..... N84-13778
N00014-79-C-0128 ..... N84-13772
N00014-79-C-0424 ..... N84-14108
N00014-80-C-0116 ..... N84-13897
N84-14041
N00014-80-C-0197 ..... N84-13890
N00014-80-C-0213 ..... N84-13314
N00014-80-C-0244 ..... N84-13237
N84-13997
N00014-80-C-0505 ..... N84-13826
N00014-80-C-0622 ..... N84-13450
N84-13820
N84-13892
N00014-80-C-0650 ..... N84-13822
N00014-80-C-0700 ..... N84-13166
N00014-81-C-2633 ..... N84-14040
N00014-81-K-0011 ..... N84-13317
N00014-81-K-0516 ..... N84-13315
N00014-81-K-0611 ..... N84-13321
N00014-81-K-0759 ..... N84-13894
N00014-82-C-0017 ..... N84-13710
N00014-82-C-2092 ..... N84-13583
N00014-82-K-0154 ..... N84-13823
N00014-82-K-0193 ..... N84-13825
N84-13890
N00014-82-K-0301 ..... N84-13824
N00014-82-K-0639 ..... N84-13507
N00014-82-K-2001 ..... N84-13988
N00014-83-K-0125 ..... N84-13891
N00014-83-K-0452 ..... N84-13996
N00014-83-WR-30104 ..... N84-13925
N00014-83-WRM3008 ..... N84-13831
N00019-81-C-0184 ..... N84-13316
N00019-81-C-0392 ..... N84-13318
N00019-82-C-0190 ..... N84-13427
N60921-81-C-0305 ..... N84-13458
N62269-81-C-0246 ..... N84-13225
PHS-MH-36551 ..... N84-13779
PROJ. AGRISTARS N84-13635
PROJ. 4858 ..... N84-13831
RF68342801 ..... N84-13708
RR00001 ..... N84-13925
RR01409 ..... N84-13426
RR014110B N84-13895
RR021054B N84-13510
RR0210542 ..... N84-13420
N84-13896
RR0220801 ..... N84-13895
RR01310441 ..... N84-13646
W-31-19-ENG-38 ..... N84-13959
W-31-109-ENG-38 ..... N84-13220
N84-13241
N84-13277
N84-13292
N84-13295
N84-13326
N84-13464
N84-13466
N84-13469
N84-13472
N84-13480
N84-13485
N84-13518
N84-13527
N84-13554
N84-13567
N84-13690
N84-13693
N84-13717
N84-13718
N84-13834
N84-13838
N84-13841
N84-13864
N84-13908
N84-13929
N84-13938
N84-13941
N84-13962
N84-13964
N84-13970
N84-13980
N84-14011
N84-14035
N84-14052
N84-14053
N84-14054
N84-14066
N84-14073
W-7405-ENG-26 ..... N84-13254
N84-13275
N84-13278
N84-13280
N84-13284
N84-13285
N84-13286
N84-13288
N84-13293
N84-13294
N84-13296
N84-13305
N84-13306
N84-13434
N84-13479
N84-13513
N84-13519
N84-13521
N84-13526
N84-13529
N84-13533
N84-13590
N84-13592
N84-13648
N84-13684

	N84-13692
	N84-13721
	N84-13723
	N84-13759
	N84-13764
	N84-13844
	N84-13847
	N84-13907
	N84-13909
	N84-14000
	N84-14001
	N84-14002
	N84-14004
	N84-14008
	N84-14017
	N84-14030
	N84-14045
	N84-14054
	N84-14068
W-7405-ENG-36	N84-13203
	N84-13246
	N84-13255
	N84-13307
	N84-13329
	N84-13330
	N84-13387
	N84-13433
	N84-13439
	N84-13440
	N84-13478
	N84-13516
	N84-13525
	N84-13555
	N84-13560
	N84-13564
	N84-13572
	N84-13681
	N84-13719
	N84-13850
	N84-13863
	N84-13901
	N84-13936
	N84-13942
	N84-13946
	N84-13950
	N84-13952
	N84-13953
	N84-13956
	N84-14003
	N84-14005
	N84-14013
	N84-14023
	N84-14031
	N84-14048
	N84-14051
	N84-14057
	N84-14091
	N84-14092
	N84-14097
	N84-14105
W-7405-ENG-48	N84-13189
	N84-13219
	N84-13228
	N84-13230
	N84-13247
	N84-13252
	N84-13279
	N84-13287
	N84-13339
	N84-13436
	N84-13438
	N84-13471
	N84-13512
	N84-13528
	N84-13543
	N84-13553
	N84-13557
	N84-13566
	N84-13568
	N84-13569
	N84-13588
	N84-13589
	N84-13600
	N84-13601
	N84-13625
	N84-13689
	N84-13722
	N84-13809
	N84-13810
	N84-13835
	N84-13843
	N84-13845
	N84-13848
	N84-13849
	N84-13865
	N84-13868
	N84-13902
	N84-13918
	N84-13947
	N84-13957
	N84-13958
	N84-13967
	N84-13972
	N84-13990
	N84-13991
	N84-13992
	N84-13993
	N84-13995
	N84-14009
	N84-14015
	N84-14028
	N84-14047
	N84-14067
	N84-14106
W-7405-ENG-82	N84-13598
	N84-13599
	N84-13621
	N84-13928
	N84-13930
023-22-00-56-00	N84-13576
153-03-60-01	N84-14096
154-10-80-18	N84-14096
176-20-10-30	N84-13706
179-70-62	N84-13207
505-31-3B	N84-13922
505-31-02B	N84-13494
505-31-13-05	N84-13500
505-31-23-07	N84-13160
505-31-23-08	N84-13161
505-31-32	N84-13924
505-31-42	N84-13187
	N84-13188
	N84-13189
505-31-53-10	N84-13162
505-32-6B	N84-13140
505-33-1A	N84-13264
505-33-33-09	N84-13309
505-33-42	N84-13610
505-33-43-09	N84-13150
505-33-52	N84-13224
505-33-54	N84-13197
505-34-01B	N84-13190
505-35-23-30	N84-13182
505-36-21	N84-13157
505-40-82	N84-13812
505-42-23-07	N84-13923
505-43-03-01	N84-13172
505-43-23-01	N84-13152
	N84-13165
505-43-23-04	N84-13163
505-43-23-10	N84-13164
505-43-43-01	N84-13138
	N84-13139
505-45-02	N84-13490
506-53-43-01	N84-13608
506-53-43-02	N84-13614
506-54-63-01	N84-13866
506-62-52	N84-13399
532-03-11	N84-13176
	N84-13177
	N84-13178
534-02-13-16	N84-13151
535-06-12	N84-13332
542-03-30-01	N84-13211
650-60-23	N84-13400
743-01-12-02	N84-13153
778-36-06	N84-14071

REPORT / ACCESSION NUMBER INDEX

Typical Report / Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-9199 ..... N84-13198* #
A-9457 ..... N84-13178* #
A-9480 ..... N84-13985* #
A-9485 ..... N84-14096* #
A-9510 ..... N84-13177* #
A-9527 ..... N84-13886* #
A-9549 ..... N84-13176* #

AAR-R545 ..... N84-13340 #

AD-A131801 ..... N84-13778 #
AD-A131930 ..... N84-13772 #
AD-A132039 ..... N84-13771 #
AD-A132046 ..... N84-13183 #
AD-A132051 ..... N84-13770 #
AD-A132078 ..... N84-13227 #
AD-A132080 ..... N84-13432 #
AD-A132081 ..... N84-13431 #
AD-A132084 ..... N84-13510 #
AD-A132095 ..... N84-13321 #
AD-A132105 ..... N84-13646 #
AD-A132106 ..... N84-13336 #
AD-A132107 ..... N84-13713 #
AD-A132108 ..... N84-13712 #
AD-A132109 ..... N84-13998 #
AD-A132123 ..... N84-13989 #
AD-A132132 ..... N84-14108 #
AD-A132136 ..... N84-13461 #
AD-A132141 ..... N84-13509 #
AD-A132143 ..... N84-13199 #
AD-A132147 ..... N84-13617 #
AD-A132151 ..... N84-13645 #
AD-A132152 ..... N84-13430 #
AD-A132156 ..... N84-13337 #
AD-A132158 ..... N84-13711 #
AD-A132162 ..... N84-13272 #
AD-A132164 ..... N84-13867 #
AD-A132165 ..... N84-13862 #
AD-A132170 ..... N84-13429 #
AD-A132172 ..... N84-13808 #
AD-A132174 ..... N84-13751 #
AD-A132175 ..... N84-14060 #
AD-A132182 ..... N84-13927 #
AD-A132183 ..... N84-13185 #
AD-A132186 ..... N84-13742 #
AD-A132195 ..... N84-13833 #
AD-A132198 ..... N84-13428 #
AD-A132206 ..... N84-13320 #
AD-A132207 ..... N84-13997 #
AD-A132210 ..... N84-13202 #
AD-A132211 ..... N84-14062 #
AD-A132213 ..... N84-13741 #
AD-A132214 ..... N84-13832 #
AD-A132217 ..... N84-13831 #
AD-A132219 ..... N84-13750 #
AD-A132220 ..... N84-13336 #
AD-A132226 ..... N84-13319 #
AD-A132227 ..... N84-13926 #
AD-A132229 ..... N84-13427 #
AD-A132234 ..... N84-13238 #
AD-A132236 ..... N84-13935 #
AD-A132237 ..... N84-13426 #
AD-A132240 ..... N84-13900 #
AD-A132244 ..... N84-13830 #
AD-A132245 ..... N84-13508 #
AD-A132247 ..... N84-13552 #
AD-A132248 ..... N84-13425 #
AD-A132249 ..... N84-13644 #
AD-A132250 ..... N84-13318 #
AD-A132259 ..... N84-13740 #
AD-A132260 ..... N84-13460 #
AD-A132262 ..... N84-14043 #
AD-A132271 ..... N84-13167 #
AD-A132272 ..... N84-13271 #
AD-A132273 ..... N84-13829 #
AD-A132274 ..... N84-13459 #
AD-A132275 ..... N84-13616 #
AD-A132276 ..... N84-13424 #
AD-A132277 ..... N84-13596 #
AD-A132278 ..... N84-13215 #
AD-A132279 ..... N84-13458 #
AD-A132280 ..... N84-13423 #
AD-A132281 ..... N84-13171 #
AD-A132283 ..... N84-13422 #
AD-A132284 ..... N84-13421 #
AD-A132292 ..... N84-13749 #
AD-A132297 ..... N84-13507 #
AD-A132299 ..... N84-13828 #
AD-A132300 ..... N84-13710 #
AD-A132305 ..... N84-13317 #
AD-A132308 ..... N84-13180 #
AD-A132311 ..... N84-13988 #
AD-A132312 ..... N84-13861 #
AD-A132315 ..... N84-13925 #
AD-A132316 ..... N84-13506 #
AD-A132319 ..... N84-13899 #
AD-A132320 ..... N84-13827 #
AD-A132321 ..... N84-13996 #
AD-A132323 ..... N84-13316 #
AD-A132325 ..... N84-13457 #
AD-A132326 ..... N84-13826 #
AD-A132328 ..... N84-13898 #
AD-A132329 ..... N84-13184 #
AD-A132330 ..... N84-13897 #
AD-A132331 ..... N84-14042 #
AD-A132339 ..... N84-13987 #
AD-A132341 ..... N84-13270 #
AD-A132347 ..... N84-13505 #
AD-A132350 ..... N84-13237 #
AD-A132351 ..... N84-13456 #
AD-A132352 ..... N84-13551 #
AD-A132354 ..... N84-13584 #
AD-A132355 ..... N84-13537 #
AD-A132358 ..... N84-13896 #
AD-A132359 ..... N84-13825 #
AD-A132362 ..... N84-13739 #
AD-A132364 ..... N84-13583 #
AD-A132365 ..... N84-14041 #
AD-A132367 ..... N84-13146 #
AD-A132371 ..... N84-13455 #
AD-A132372 ..... N84-13536 #
AD-A132373 ..... N84-13454 #
AD-A132374 ..... N84-13550 #
AD-A132379 ..... N84-14040 #
AD-A132386 ..... N84-13226 #
AD-A132387 ..... N84-14039 #
AD-A132392 ..... N84-13824 #
AD-A132397 ..... N84-13315 #
AD-A132398 ..... N84-13582 #
AD-A132400 ..... N84-13420 #
AD-A132401 ..... N84-13419 #
AD-A132403 ..... N84-13895 #
AD-A132406 ..... N84-13418 #
AD-A132411 ..... N84-13986 #
AD-A132418 ..... N84-13417 #
AD-A132421 ..... N84-14107 #
AD-A132425 ..... N84-13615 #
AD-A132427 ..... N84-13335 #
AD-A132429 ..... N84-14038 #
AD-A132443 ..... N84-13709 #
AD-A132448 ..... N84-13581 #
AD-A132450 ..... N84-13453 #
AD-A132455 ..... N84-13166 #
AD-A132462 ..... N84-13314 #
AD-A132486 ..... N84-13906 #
AD-A132487 ..... N84-13894 #
AD-A132471 ..... N84-13738 #
AD-A132474 ..... N84-13452 #
AD-A132479 ..... N84-13201 #
AD-A132487 ..... N84-13737 #
AD-A132491 ..... N84-13214 #
AD-A132495 ..... N84-13560 #
AD-A132498 ..... N84-13179 #
AD-A132499 ..... N84-13893 #
AD-A132500 ..... N84-13892 #
AD-A132501 ..... N84-13891 #
AD-A132503 ..... N84-13823 #
AD-A132505 ..... N84-13196 #
AD-A132512 ..... N84-13822 #
AD-A132514 ..... N84-13313 #
AD-A132515 ..... N84-13821 #
AD-A132516 ..... N84-13334 #
AD-A132522 ..... N84-13890 #
AD-A132526 ..... N84-13708 #
AD-A132528 ..... N84-13451 #
AD-A132535 ..... N84-13217 #
AD-A132536 ..... N84-13450 #
AD-A132537 ..... N84-13889 #
AD-A132538 ..... N84-13820 #
AD-A132541 ..... N84-13549 #
AD-A132543 ..... N84-13934 #
AD-A132544 ..... N84-13888 #
AD-A132545 ..... N84-14037 #
AD-A132548 ..... N84-13819 #
AD-A132549 ..... N84-14072 #
AD-A132551 ..... N84-13333 #
AD-A132552 ..... N84-13807 #
AD-A132553 ..... N84-13504 #
AD-A132554 ..... N84-13216 #
AD-A132564 ..... N84-13449 #
AD-A132569 ..... N84-13818 #
AD-A132574 ..... N84-13887 #
AD-A132577 ..... N84-13773 #
AD-A132582 ..... N84-13269 #
AD-A132583 ..... N84-13817 #
AD-A132586 ..... N84-13225 #
AD-A133081 ..... N84-13470 #
AD-A133467 ..... N84-13565 #
AD-A134041 ..... N84-13483 #

AD-E000540 ..... N84-13426 #
AD-E000541 ..... N84-13896 #
AD-E000542 ..... N84-13420 #
AD-E401062 ..... N84-13319 #
AD-E401062 ..... N84-13336 #
AD-E401062 ..... N84-13427 #
AD-E401062 ..... N84-13750 #
AD-E401062 ..... N84-13926 #
AD-E401065 ..... N84-13238 #
AD-E750769 ..... N84-13227 #
AD-E750839 ..... N84-13320 #
AD-E750839 ..... N84-13997 #
AD-E800784 ..... N84-13338 #
AD-E800784 ..... N84-13646 #
AD-E800784 ..... N84-13712 #
AD-E800784 ..... N84-13713 #
AD-E800784 ..... N84-13998 #
AD-E850405 ..... N84-13185 #
AD-E850405 ..... N84-13199 #
AD-E850405 ..... N84-13272 #
AD-E850405 ..... N84-13337 #
AD-E850405 ..... N84-13429 #
AD-E850405 ..... N84-13430 #
AD-E850405 ..... N84-13451 #
AD-E850405 ..... N84-13509 #
AD-E850405 ..... N84-13617 #
AD-E850405 ..... N84-13645 #
AD-E850405 ..... N84-13711 #
AD-E850405 ..... N84-13742 #
AD-E850405 ..... N84-13751 #
AD-E850405 ..... N84-13808 #
AD-E850405 ..... N84-13862 #
AD-E850405 ..... N84-13867 #
AD-E850405 ..... N84-13927 #
AD-E850405 ..... N84-13989 #
AD-E850405 ..... N84-14060 #
AD-E850405 ..... N84-14108 #

AD-E950428 ..... N84-13237 #
AD-E950428 ..... N84-13456 #
AD-E950428 ..... N84-13551 #

AD-F500197 ..... N84-13935 #
AD-F630038 ..... N84-14107 #
AD-F630051 ..... N84-13184 #
AD-F630051 ..... N84-13316 #
AD-F630051 ..... N84-13457 #
AD-F630051 ..... N84-13826 #
AD-F630051 ..... N84-13897 #
AD-F630051 ..... N84-13898 #
AD-F630051 ..... N84-13996 #
AD-F630051 ..... N84-14042 #

AFGL-ERP-828 ..... N84-13712 #

AFGL-PSRP-666 ..... N84-13713 #

AFGL-TR-83-0065 ..... N84-13712 #
AFGL-TR-83-0067 ..... N84-13713 #
AFGL-TR-83-0082 ..... N84-13740 #
AFGL-TR-83-0124 ..... N84-13460 #

AFHRL-TP-83-47 ..... N84-13773 #

AFHRL-TR-83-19 ..... N84-13770 #

AFIT/CI/NR-83-19D ..... N84-13452 #
AFIT/CI/NR-83-25T ..... N84-13214 #
AFIT/CI/NR-83-27D ..... N84-13888 #
AFIT/CI/NR-83-28D ..... N84-13818 #
AFIT/CI/NR-83-31D ..... N84-13819 #
AFIT/CI/NR-83-34T ..... N84-13584 #
AFIT/CI/NR-83-35D ..... N84-13537 #
AFIT/CI/NR-83-37D ..... N84-13934 #

AFLRL-168 ..... N84-13337 #

AFWAL-TR-82-2128 ..... N84-13336 #
AFWAL-TR-83-2007 ..... N84-13319 #
AFWAL-TR-83-4028 ..... N84-13272 #

AFWL-TR-83-19 ..... N84-13550 #
AFWL-TR-83-45 ..... N84-13418 #

AI-TR-728 ..... N84-13826 #

AIAA-84-0192 ..... N84-13190* #
AIAA-84-0531 ..... N84-13494* #

AMMRC-TR-83-18 ..... N84-13196 #
AMMRC-TR-83-43 ..... N84-13926 #

ANL-HEP-CP-82-24 ..... N84-13980 #
ANL-HEP-CP-83-47 ..... N84-13962 #

ANL-83-70 ..... N84-13841 #
ANL-83-73 ..... N84-13527 #
ANL-83-74 ..... N84-13518 #
ANL-8040-SUPPL-6 ..... N84-13834 #

ANL/ES-133 ..... N84-13693 #

ANL/NDM-80 ..... N84-13970 #

ANL/OEPM-83-9 ..... N84-13464 #

ANL/SPG-24 ..... N84-13466 #

AR-1 ..... N84-13223* #
AR-5 ..... N84-13324 #
AR-002-911 ..... N84-13191 #
AR-002-925 ..... N84-13174 #
AR-002-943 ..... N84-13879 #
AR-002-948 ..... N84-13578 #
AR-002-952 ..... N84-13910 #

ARB-R-83-198 ..... N84-13697 #

ARL-AERO-REPT-157 ..... N84-13174 #

ARL-MECH-ENG-NOTE-393 ..... N84-13191 #

ARL-STRUC-NOTE-485 ..... N84-13879 #
ARL-STRUC-NOTE-486 ..... N84-13578 #

ARL-SYS-NOTE-83 ..... N84-13910 #

ARLCD-TR-83033 ..... N84-13238 #

ARO-20140.3-MA ..... N84-13831 #
ARO-20140.6-MA ..... N84-13900 #

ATC-118 ..... N84-13171 #
ATC-123 ..... N84-13181 #

BBC-RD-1983/13 ..... N84-13396

BBN-5238 ..... N84-13827 #

BDX-613-2961 ..... N84-13545 #
BDX-613-2962 ..... N84-13544 #
BDX-613-2982 ..... N84-13842 #
BDX-613-2983 ..... N84-13229 #
BDX-613-2990 ..... N84-13331 #

BLL-M-35321 ..... N84-13258 #
BLL-M-35347-(5828.4) ..... N84-13262 #
BLL-M-35351-(5828.4F) ..... N84-13594 #
BLL-M-35352 ..... N84-13575 #
BLL-M-35357-(5828.4) ..... N84-13261 #
BLL-M-35369-(5828.4F) ..... N84-13606 #

BLL-OA-TRANS-2633-(6196.3) ..... N84-13448 #
BLL-OA-TRANS-2634-(6196.3) ..... N84-13447 #
BLL-OA-TRANS-2639-(6196.3) ..... N84-13503 #
BLL-OA-TRANS-3047-(6196.3) ..... N84-13502 #
BLL-OA-TRANS-3057-(6196.3) ..... N84-13260 #
BLL-OA-TRANS-3067-(6196.3) ..... N84-13268 #
BLL-OA-TRANS-3069-(6196.3) ..... N84-13267 #
BLL-OA-TRANS-3070-(6196.3) ..... N84-13259 #

BM-RI-8774 ..... N84-13547 #
BM-RI-8777 ..... N84-13656 #
BM-RI-8783 ..... N84-13593 #

BNL-33439 ..... N84-14058 #
BNL-33487 ..... N84-13982 #
BNL-33553 ..... N84-13760 #
BNL-33592 ..... N84-13383 #
BNL-33593 ..... N84-13385 #
BNL-33601 ..... N84-13477 #
BNL-33604 ..... N84-13298 #
BNL-33605 ..... N84-13299 #
BNL-33607 ..... N84-13963 #
BNL-33609 ..... N84-14050 #
BNL-33659 ..... N84-13476 #
BNL-33666 ..... N84-13300 #
BNL-33692 ..... N84-14056 #
BNL-33698 ..... N84-13969 #
BNL-33703 ..... N84-13539 #
BNL-33793 ..... N84-13974 #
BNL-51695 ..... N84-13484 #

BR-89448 ..... N84-13602 #

BR89480 ..... N84-13312 #
BR89770 ..... N84-13381 #

CALSPAN-6968-A-2 ..... N84-13591 #

CEA-R-5061 ..... N84-13525 #

CONF-820233-SUMM ..... N84-13981 #
CONF-820888-2 ..... N84-13743 #
CONF-820906-40 ..... N84-13684 #
CONF-820935-11 ..... N84-14054 #
CONF-820948-13 ..... N84-13434 #
CONF-821089-14 ..... N84-13556 #
CONF-830149-1 ..... N84-13523 #
CONF-830149-2 ..... N84-13512 #
CONF-830231-4 ..... N84-13976 #
CONF-830311-188 ..... N84-13475 #
CONF-830339-5 ..... N84-13965 #
CONF-830406-12 ..... N84-13948 #
CONF-830406-108 ..... N84-14014 #
CONF-830455-9 ..... N84-13974 #
CONF-830549-2 ..... N84-13248 #
CONF-830558-1 ..... N84-13521 #
CONF-830573-8 ..... N84-14052 #
CONF-830577-4 ..... N84-13838 #
CONF-830588-4 ..... N84-13959 #
CONF-830621-42 ..... N84-13569 #
CONF-830621-43 ..... N84-13471 #
CONF-830621-44 ..... N84-14028 #
CONF-830675-6 ..... N84-13964 #
CONF-830689-5 ..... N84-13968 #
CONF-830689-7 ..... N84-13203 #
CONF-830702-7-REV-2 ..... N84-13689 #
CONF-830704-7 ..... N84-13528 #
CONF-830704-9 ..... N84-14047 #
CONF-830706-7 ..... N84-13917
CONF-830710-10 ..... N84-13765 #
CONF-830711-5 ..... N84-13325 #
CONF-830718-8 ..... N84-13476 #
CONF-830719-43 ..... N84-13563 #
CONF-830719-44 ..... N84-13566 #
CONF-830763-7 ..... N84-14057 #
CONF-830768-2 ..... N84-13287 #
CONF-830772-6 ..... N84-14097 #
CONF-830775-1 ..... N84-13836 #
CONF-830789-1 ..... N84-13919 #

CONF-830797-1 ..... N84-14092 #
CONF-830797-3 ..... N84-14104 #
CONF-830797-4 ..... N84-14105 #
CONF-830797-6 ..... N84-14106 #
CONF-830798-4 ..... N84-13253 #
CONF-830811-3 ..... N84-13620 #
CONF-830811-7 ..... N84-13599 #
CONF-830811-8 ..... N84-13928 #
CONF-830811-11 ..... N84-13598 #
CONF-830811-13 ..... N84-13930 #
CONF-830811-15 ..... N84-13621 #
CONF-830811-16 ..... N84-13597 #
CONF-830811-17 ..... N84-13601 #
CONF-830812-43 ..... N84-13529 #
CONF-830812-47 ..... N84-13533 #
CONF-830812-48 ..... N84-13526 #
CONF-830812-53 ..... N84-13590 #
CONF-830812-55 ..... N84-13531 #
CONF-830819 ..... N84-13540 #
CONF-830822-13 ..... N84-13478 #
CONF-830822-14 ..... N84-13983 #
CONF-830822-20 ..... N84-13982 #
CONF-830822-23 ..... N84-13961 #
CONF-830822-24 ..... N84-13963 #
CONF-830822-25 ..... N84-14050 #
CONF-830822-26 ..... N84-13962 #
CONF-830822-36 ..... N84-13969 #
CONF-830833-2 ..... N84-13943 #
CONF-830841-7 ..... N84-13386 #
CONF-830841-10 ..... N84-13479 #
CONF-830841-12 ..... N84-13385 #
CONF-830841-18 ..... N84-13383 #
CONF-830841-19 ..... N84-13520 #
CONF-830841-20 ..... N84-13384 #
CONF-830841-21 ..... N84-14049 #
CONF-830841-23 ..... N84-13477 #
CONF-830845-3 ..... N84-13289 #
CONF-830845-4 ..... N84-13300 #
CONF-830847-1 ..... N84-13864 #
CONF-830847-3 ..... N84-14073 #
CONF-830871-4 ..... N84-13288 #
CONF-830871-5 ..... N84-13306 #
CONF-830872-2 ..... N84-13762 #
CONF-830872-3 ..... N84-13763 #
CONF-830874-23 ..... N84-13993 #
CONF-830874-28 ..... N84-13554 #
CONF-830874-29 ..... N84-13572 #
CONF-830888-9 ..... N84-13298 #
CONF-830888-10 ..... N84-13299 #
CONF-830895-5 ..... N84-13680 #
CONF-830895-8 ..... N84-14058 #
CONF-830910-1 ..... N84-14068 #
CONF-830910-2 ..... N84-13539 #
CONF-830911 ..... N84-13967 #
CONF-830911-4 ..... N84-14012 #
CONF-830911-6 ..... N84-14010 #
CONF-830911-15 ..... N84-13977 #
CONF-830911-16 ..... N84-13465 #
CONF-830911-17 ..... N84-14029 #
CONF-830911-18 ..... N84-13949 #
CONF-830911-19 ..... N84-13939 #
CONF-830911-20 ..... N84-13940 #
CONF-830911-21 ..... N84-13951 #
CONF-830911-22 ..... N84-13954 #
CONF-830911-24 ..... N84-14005 #
CONF-830911-25 ..... N84-13557 #
CONF-830911-26 ..... N84-14003 #
CONF-830911-27 ..... N84-13433 #
CONF-830911-29 ..... N84-13956 #
CONF-830911-30 ..... N84-13950 #
CONF-830911-31 ..... N84-13440 #
CONF-830911-32 ..... N84-13946 #
CONF-830911-33 ..... N84-13947 #
CONF-830918-4 ..... N84-13752 #
CONF-830920-8 ..... N84-14016 #
CONF-830941-34 ..... N84-13278 #
CONF-830942-7 ..... N84-13292 #
CONF-830942-8 ..... N84-14035 #
CONF-830942-9 ..... N84-13277 #
CONF-830942-12 ..... N84-13291 #
CONF-830942-13 ..... N84-14026 #
CONF-830942-15 ..... N84-13295 #
CONF-830942-16 ..... N84-13296 #
CONF-830942-19 ..... N84-13275 #
CONF-830942-20 ..... N84-14002 #
CONF-830942-22 ..... N84-13305 #
CONF-830942-28 ..... N84-13285 #
CONF-830942-29 ..... N84-13293 #
CONF-830942-31 ..... N84-13273 #
CONF-830942-33 ..... N84-13294 #
CONF-830942-37 ..... N84-14048 #
CONF-830942-39 ..... N84-14031 #
CONF-830942-42 ..... N84-13281 #
CONF-830942-43 ..... N84-13283 #
CONF-830942-44 ..... N84-13282 #
CONF-830942-46 ..... N84-13329 #

CONF-830942-47 ..... N84-13304 #
CONF-830942-49 ..... N84-13276 #
CONF-830942-51 ..... N84-14033 #
CONF-830942-52 ..... N84-13303 #
CONF-830942-53 ..... N84-13302 #
CONF-830950-2 ..... N84-14069 #
CONF-830969-2 ..... N84-13543 #
CONF-830971-3 ..... N84-13918 #
CONF-830974-7 ..... N84-13589 #
CONF-830976-4 ..... N84-13231 #
CONF-830980-3 ..... N84-13516 #
CONF-830999-2 ..... N84-13245 #
CONF-831011-2 ..... N84-13239 #
CONF-831011-3 ..... N84-13247 #
CONF-831020-3 ..... N84-13472 #
CONF-831025-12 ..... N84-13991 #
CONF-831025-13 ..... N84-13990 #
CONF-831028-1 ..... N84-13687 #
CONF-831047-19 ..... N84-13908 #
CONF-831047-55 ..... N84-14011 #
CONF-831047-73-SUMM ..... N84-13326 #
CONF-831069-1 ..... N84-13722 #
CONF-831070-2 ..... N84-13958 #
CONF-831086-6 ..... N84-13254 #
CONF-831091-1 ..... N84-13436 #
CONF-831104-1 ..... N84-13469 #
CONF-831104-2 ..... N84-13480 #
CONF-831111-1 ..... N84-13524 #
CONF-831111-2 ..... N84-13517 #
CONF-831111-8 ..... N84-13849 #
CONF-831171-1 ..... N84-14009 #
CONF-831171-2 ..... N84-13960 #
CONF-831171-3 ..... N84-13252 #
CONF-831171-4 ..... N84-13279 #
CONF-831171-5 ..... N84-13246 #
CONF-831171-7 ..... N84-13973 #
CONF-831187-3 ..... N84-14053 #
CONF-831187-5 ..... N84-13307 #
CONF-831187-6 ..... N84-13330 #
CONF-831235-1 ..... N84-14065 #
CONF-8206123 ..... N84-13980 #
CONF-8206187 ..... N84-13532 #
CONF-8304116-1 ..... N84-13250 #
CONF-8304912-2 ..... N84-13844 #
CONF-8305100-4 ..... N84-13485 #
CONF-8305110-3 ..... N84-13901 #
CONF-8305110-4 ..... N84-13255 #
CONF-8305127-2 ..... N84-13560 #
CONF-8305133-1 ..... N84-14091 #
CONF-8305137-1 ..... N84-13758 #
CONF-8306110-3 ..... N84-14056 #
CONF-8306116-1-REV ..... N84-13994 #
CONF-8306127-1 ..... N84-13944 #
CONF-8307101-1 ..... N84-13585 #
CONF-8307102-1 ..... N84-13942 #
CONF-8307103-2 ..... N84-13972 #
CONF-8307991 ..... N84-13929 #
CONF-8308106-7 ..... N84-13653 #
CONF-8308110-4 ..... N84-13760 #
CONF-8308110-5 ..... N84-13764 #
CONF-8308112-1 ..... N84-14017 #
CONF-8308112-3 ..... N84-13562 #
CONF-8308114-2 ..... N84-13571 #
CONF-8308117-1 ..... N84-13718 #
CONF-8308117-2 ..... N84-13717 #
CONF-8308123-1 ..... N84-14051 #
CONF-8308124-1 ..... N84-13692 #
CONF-8308125-1 ..... N84-13220 #
CONF-8308125-2 ..... N84-13938 #
CONF-8308127-1 ..... N84-13848 #
CONF-8309103-8 ..... N84-13995 #
CONF-8309103-9 ..... N84-13567 #
CONF-8309103-10 ..... N84-14055 #
CONF-8309133-2 ..... N84-13241 #
CONF-8309135-2 ..... N84-13522 #
CONF-8309135-3 ..... N84-13850 #
CONF-8309135-4 ..... N84-13588 #
CONF-8309137-2 ..... N84-13902 #
CONF-8309137-3 ..... N84-14008 #
CONF-8309141-1 ..... N84-13992 #
CONF-8309142-1 ..... N84-14015 #
CONF-8309144-4 ..... N84-13952 #
CONF-8309144-5 ..... N84-13953 #
CONF-8309145-1 ..... N84-13568 #
CONF-8309147-1 ..... N84-14013 #
CONF-8309149-1 ..... N84-13323 #
CONF-8309150-1 ..... N84-13690 #
CONF-8309154-1 ..... N84-13810 #
CONF-8309155-1 ..... N84-13553 #
CONF-8309155-2 ..... N84-13555 #
CONF-8309156-1 ..... N84-13941 #
CONF-8309156-2 ..... N84-13936 #
CONF-8309158-1 ..... N84-13559 #
CONF-8309159-1 ..... N84-13868 #
CONF-8309160-1 ..... N84-13648 #
CONF-8309162-1 ..... N84-13481 #
CONF-8309165-1 ..... N84-13863 #
CONF-8309166-1 ..... N84-13538 #
CONF-8310111-4-REV-1 ..... N84-13339 #
CONF-8310161-1 ..... N84-14066 #
CONF-8310162-7 ..... N84-13655 #
CONF-8310163-1 ..... N84-13297 #
CONF-8310163-2 ..... N84-13328 #
CONF-8310163-3 ..... N84-13515 #
CONF-8310166-1 ..... N84-13619 #
CONF-8310171-1 ..... N84-13219 #
CONTRIB-605 ..... N84-13753 #
CONTRIB-634 ..... N84-13661 #
COO-1195-477 ..... N84-13437 #
COO-1195-476 ..... N84-13837 #
COO-1599-235-PT-1 ..... N84-13761 #
COO-2218-295 ..... N84-14006 #
COO-10591-4 ..... N84-13327 #
CRC-530 ..... N84-13338 #
CSIF-RR-553 ..... N84-13579 #
CSIR-BRR-573 ..... N84-13311 #
CSIR-CENG-413 ..... N84-13236 #
CSIR-CENG-423 ..... N84-13235 #
CSIR-CENG-432 ..... N84-13234 #
CSIR-ELEK-249 ..... N84-13733 #
CSIR-ME-452 ..... N84-13498 #
CSIR-ME-1763 ..... N84-13535 #
CSIR-NBRI-SR-BOU-60 ..... N84-13734 #
CSIR-NIAST-82/57 ..... N84-13444 #
CSIR-NIAST-82/72 ..... N84-13156 #
CSIR-PERS-303 ..... N84-13776 #
CSIR-PERS-339 ..... N84-13776 #
CSIR-RR-388/1-PT-1 ..... N84-13496 #
CSIR-RR-388/2-PT-2 ..... N84-13497 #
CSIR-S-267 ..... N84-13806 #
CSIR-SR-283 ..... N84-13233 #
CSIR-T/SEA-8134 ..... N84-13805 #
CSIR-T/SEA-8207 ..... N84-14064 #
CSIR-TR-RF/6/81 ..... N84-13814 #
CSIR-TR-83 ..... N84-13904 #
CSIR-TWISK-267 ..... N84-13873 #
CSIR-TWISK-270 ..... N84-13874 #
CSIR-TWISK-271 ..... N84-13877 #
CSIR-TWISK-272 ..... N84-13876 #
CSIR-TWISK-274 ..... N84-13875 #
CSIR-TWISK-275 ..... N84-13903 #
CSIR-TWISK-276 ..... N84-13878 #
CSMI/TR-83-01 ..... N84-13817 #
CTR-3-8-80-256-3 ..... N84-13389 #
DELET-TR-79-0272-F ..... N84-13459 #
DELEW-TR-83-2 ..... N84-13893 #
DE83-009572 ..... N84-13980 #
DE83-011400 ..... N84-13844 #
DE83-011646 ..... N84-13981 #
DE83-011934 ..... N84-13524 #
DE83-011982 ..... N84-13530 #
DE83-011992 ..... N84-13757 #
DE83-011993 ..... N84-13682 #
DE83-011996 ..... N84-13676 #
DE83-012084 ..... N84-14065 #
DE83-012593 ..... N84-13521 #
DE83-012765 ..... N84-13532 #
DE83-013070 ..... N84-14099 #
DE83-013695 ..... N84-13958 #
DE83-013862 ..... N84-13436 #
DE83-014311 ..... N84-13485 #
DE83-014698 ..... N84-13908 #
DE83-014790 ..... N84-14011 #
DE83-014898 ..... N84-14016 #
DE83-015080 ..... N84-13482 #
DE83-015166 ..... N84-13242 #
DE83-015260 ..... N84-14057 #
DE83-015297 ..... N84-13834 #
DE83-015376 ..... N84-13326 #
DE83-015531 ..... N84-13994 #
DE83-015784 ..... N84-13651 #
DE83-016082 ..... N84-13762 #
DE83-016127 ..... N84-14019 #
DE83-016164 ..... N84-13763 #
DE83-016181 ..... N84-13836 #
DE83-016184 ..... N84-13325 #
DE83-016205 ..... N84-14020 #
DE83-016323 ..... N84-13540 #
DE83-016353 ..... N84-14023 #
DE83-016367 ..... N84-13722 #
DE83-016441 ..... N84-13976 #
DE83-016576 ..... N84-13843 #
DE83-016604 ..... N84-13250 #
DE83-016629 ..... N84-13563 #
DE83-016639 ..... N84-13542 #
DE83-016644 ..... N84-13919 #
DE83-016645 ..... N84-13652 #
DE83-016696 ..... N84-13680 #
DE83-016730 ..... N84-14058 #
DE83-016745 ..... N84-14022 #
DE83-016758 ..... N84-14021 #
DE83-016763 ..... N84-13840 #
DE83-016789 ..... N84-13761 #
DE83-016854 ..... N84-13723 #
DE83-016878 ..... N84-14018 #
DE83-016927 ..... N84-13289 #
DE83-016942 ..... N84-14009 #
DE83-017137 ..... N84-13529 #
DE83-017158 ..... N84-13522 #
DE83-017188 ..... N84-13306 #
DE83-017191 ..... N84-13288 #
DE83-017194 ..... N84-13533 #
DE83-017206 ..... N84-14017 #
DE83-017218 ..... N84-13526 #
DE83-017224 ..... N84-13692 #
DE83-017226 ..... N84-13764 #
DE83-017229 ..... N84-14051 #
DE83-017273 ..... N84-13479 #
DE83-017282 ..... N84-13590 #
DE83-017291 ..... N84-13478 #
DE83-017297 ..... N84-14092 #
DE83-017300 ..... N84-13528 #
DE83-017304 ..... N84-14091 #
DE83-017311 ..... N84-14013 #
DE83-017312 ..... N84-13850 #
DE83-017326 ..... N84-14097 #
DE83-017327 ..... N84-13983 #
DE83-017328 ..... N84-13386 #
DE83-017351 ..... N84-13982 #
DE83-017371 ..... N84-13324 #
DE83-017373 ..... N84-13868 #
DE83-017403 ..... N84-13473 #
DE83-017422 ..... N84-13846 #
DE83-017473 ..... N84-13993 #
DE83-017495 ..... N84-13766 #
DE83-017528 ..... N84-13525 #
DE83-017535 ..... N84-13475 #
DE83-017547 ..... N84-13865 #
DE83-017581 ..... N84-13960 #
DE83-017591 ..... N84-13918 #
DE83-017615 ..... N84-13589 #
DE83-017618 ..... N84-13849 #
DE83-017620 ..... N84-13967 #
DE83-017621 ..... N84-13902 #
DE83-017686 ..... N84-13620 #
DE83-017688 ..... N84-14014 #
DE83-017697 ..... N84-13647 #
DE83-017699 ..... N84-13743 #
DE83-017739 ..... N84-13251 #
DE83-017741 ..... N84-13384 #
DE83-017747 ..... N84-13961 #
DE83-017749 ..... N84-14049 #
DE83-017762 ..... N84-13963 #
DE83-017764 ..... N84-13385 #
DE83-017767 ..... N84-13520 #
DE83-017779 ..... N84-13327 #
DE83-017785 ..... N84-13541 #
DE83-017791 ..... N84-14012 #
DE83-017793 ..... N84-14010 #
DE83-017830 ..... N84-13600 #
DE83-017832 ..... N84-13438 #
DE83-017834 ..... N84-14015 #
DE83-017839 ..... N84-13992 #
DE83-017865 ..... N84-13435 #
DE83-017873 ..... N84-13721 #
DE83-017875 ..... N84-14050 #
DE83-017880 ..... N84-13691 #
DE83-017885 ..... N84-13624 #
DE83-017886 ..... N84-13847 #
DE83-017897 ..... N84-13720 #
DE83-017923 ..... N84-13929 #
DE83-017925 ..... N84-13469 #
DE83-017927 ..... N84-13864 #
DE83-017929 ..... N84-13962 #
DE83-017930 ..... N84-13717 #

DE83-017932 ..... N84-13837 #
DE83-017936 ..... N84-13472 #
DE83-017942 ..... N84-13718 #
DE83-017945 ..... N84-13838 #
DE83-017958 ..... N84-13964 #
DE83-017972 ..... N84-13437 #
DE83-017974 ..... N84-13959 #
DE83-017982 ..... N84-13760 #
DE83-017986 ..... N84-14067 #
DE83-017987 ..... N84-13809 #
DE83-017989 ..... N84-13527 #
DE83-018005 ..... N84-13471 #
DE83-018027 ..... N84-14028 #
DE83-018073 ..... N84-13599 #
DE83-018076 ..... N84-13598 #
DE83-018082 ..... N84-13928 #
DE83-018083 ..... N84-13621 #
DE83-018085 ..... N84-13965 #
DE83-018086 ..... N84-13930 #
DE83-018113 ..... N84-13839 #
DE83-018114 ..... N84-13470 #
DE83-018119 ..... N84-13253 #
DE83-018181 ..... N84-13995 #
DE83-018184 ..... N84-13569 #
DE83-018186 ..... N84-13477 #
DE83-018188 ..... N84-13568 #
DE83-018216 ..... N84-13558 #
DE83-018226 ..... N84-13654 #
DE83-018227 ..... N84-13625 #
DE83-018275 ..... N84-13476 #
DE83-018297 ..... N84-13300 #
DE83-018300 ..... N84-14030 #
DE84-00061 ..... N84-13301 #
DE84-90073 ..... N84-13322 #
DE84-000003 ..... N84-13758 #
DE84-000008 ..... N84-13675 #
DE84-000009 ..... N84-13744 #
DE84-000042 ..... N84-13523 #
DE84-000048 ..... N84-14027 #
DE84-000049 ..... N84-14024 #
DE84-000066 ..... N84-13683 #
DE84-000067 ..... N84-13685 #
DE84-000071 ..... N84-13566 #
DE84-000102 ..... N84-14029 #
DE84-000103 ..... N84-14026 #
DE84-000107 ..... N84-13681 #
DE84-000109 ..... N84-13439 #
DE84-000112 ..... N84-13964 #
DE84-000114 ..... N84-13752 #
DE84-000115 ..... N84-13977 #
DE84-000117 ..... N84-13465 #
DE84-000121 ..... N84-13653 #
DE84-000129 ..... N84-13564 #
DE84-000133 ..... N84-13587 #
DE84-000138 ..... N84-13481 #
DE84-000153 ..... N84-13287 #
DE84-000154 ..... N84-13588 #
DE84-000156 ..... N84-13848 #
DE84-000159 ..... N84-13553 #
DE84-000163 ..... N84-13938 #
DE84-000164 ..... N84-13220 #
DE84-000165 ..... N84-13689 #
DE84-000174 ..... N84-13252 #
DE84-000181 ..... N84-13716 #
DE84-000184 ..... N84-13279 #
DE84-000192 ..... N84-13841 #
DE84-000193 ..... N84-13693 #
DE84-000244 ..... N84-13286 #
DE84-000258 ..... N84-14001 #
DE84-000260 ..... N84-13294 #
DE84-000296 ..... N84-14045 #
DE84-000301 ..... N84-13565 #
DE84-000302 ..... N84-13842 #
DE84-000311 ..... N84-13941 #
DE84-000314 ..... N84-13229 #
DE84-000333 ..... N84-14000 #
DE84-000334 ..... N84-13971 #
DE84-000338 ..... N84-13293 #
DE84-000339 ..... N84-13285 #
DE84-000345 ..... N84-14068 #
DE84-000346 ..... N84-13759 #
DE84-000353 ..... N84-13297 #
DE84-000356 ..... N84-13940 #
DE84-000357 ..... N84-13949 #
DE84-000359 ..... N84-13835 #
DE84-000361 ..... N84-13231 #
DE84-000362 ..... N84-13559 #
DE84-000363 ..... N84-13562 #
DE84-000364 ..... N84-13917
DE84-000369 ..... N84-14003 #
DE84-000393 ..... N84-14054 #
DE84-000400 ..... N84-13538 #
DE84-000404 ..... N84-13586 #
DE84-000406 ..... N84-13686 #
DE84-000411 ..... N84-13296 #
DE84-000412 ..... N84-13275 #
DE84-000439 ..... N84-13484 #
DE84-000440 ..... N84-13650 #
DE84-000447 ..... N84-13719 #
DE84-000451 ..... N84-13328 #
DE84-000452 ..... N84-13323 #
DE84-000456 ..... N84-13954 #
DE84-000457 ..... N84-13939 #
DE84-000458 ..... N84-13951 #
DE84-000463 ..... N84-14093 #
DE84-000468 ..... N84-13464 #
DE84-000469 ..... N84-13810 #
DE84-000476 ..... N84-13944 #
DE84-000477 ..... N84-13291 #
DE84-000482 ..... N84-13619 #
DE84-000510 ..... N84-14025 #
DE84-000516 ..... N84-13230 #
DE84-000517 ..... N84-13957 #
DE84-000524 ..... N84-13340 #
DE84-000526 ..... N84-13645 #
DE84-000528 ..... N84-13467 #
DE84-000565 ..... N84-14035 #
DE84-000566 ..... N84-13690 #
DE84-000568 ..... N84-14053 #
DE84-000586 ..... N84-13567 #
DE84-000588 ..... N84-13241 #
DE84-000592 ..... N84-14066 #
DE84-000593 ..... N84-13292 #
DE84-000597 ..... N84-13277 #
DE84-000599 ..... N84-14052 #
DE84-000600 ..... N84-14073 #
DE84-000611 ..... N84-13295 #
DE84-000612 ..... N84-13480 #
DE84-000614 ..... N84-13554 #
DE84-000629 ..... N84-13243 #
DE84-000638 ..... N84-13684 #
DE84-000640 ..... N84-13556 #
DE84-000643 ..... N84-13434 #
DE84-000653 ..... N84-13466 #
DE84-000663 ..... N84-13531 #
DE84-000677 ..... N84-13571 #
DE84-000679 ..... N84-13304 #
DE84-000690 ..... N84-13648 #
DE84-000691 ..... N84-13278 #
DE84-000713 ..... N84-13677 #
DE84-000722 ..... N84-13943 #
DE84-000723 ..... N84-14008 #
DE84-000724 ..... N84-14002 #
DE84-000725 ..... N84-13305 #
DE84-000800 ..... N84-13511 #
DE84-000805 ..... N84-13273 #
DE84-000823 ..... N84-14032 #
DE84-000824 ..... N84-13570 #
DE84-000840 ..... N84-13591 #
DE84-000872 ..... N84-13966 #
DE84-000903 ..... N84-13302 #
DE84-000916 ..... N84-13512 #
DE84-000917 ..... N84-14104 #
DE84-000926 ..... N84-13239 #
DE84-000943 ..... N84-13655 #
DE84-000945 ..... N84-13515 #
DE84-000956 ..... N84-13973 #
DE84-000957 ..... N84-13245 #
DE84-000963 ..... N84-13678 #
DE84-000967 ..... N84-13679 #
DE84-000978 ..... N84-13474 #
DE84-000979 ..... N84-13290 #
DE84-000993 ..... N84-13968 #
DE84-000998 ..... N84-13514 #
DE84-000999 ..... N84-13240 #
DE84-001000 ..... N84-13244 #
DE84-001017 ..... N84-13942 #
DE84-001018 ..... N84-13901 #
DE84-001038 ..... N84-13560 #
DE84-001039 ..... N84-14105 #
DE84-001068 ..... N84-13863 #
DE84-001086 ..... N84-13228 #
DE84-001105 ..... N84-14046 #
DE84-001124 ..... N84-13441 #
DE84-001132 ..... N84-14059 #
DE84-001137 ..... N84-13622 #
DE84-001157 ..... N84-14047 #
DE84-001175 ..... N84-13255 #
DE84-001180 ..... N84-13280 #
DE84-001203 ..... N84-13299 #
DE84-001206 ..... N84-13298 #
DE84-001215 ..... N84-14044 #
DE84-001227 ..... N84-13649 #
DE84-001237 ..... N84-13557 #
DE84-001238 ..... N84-13219 #
DE84-001252 ..... N84-13468 #
DE84-001276 ..... N84-13276 #
DE84-001277 ..... N84-13618 #
DE84-001278 ..... N84-13937 #
DE84-001279 ..... N84-14006 #
DE84-001292 ..... N84-13585 #
DE84-001296 ..... N84-13281 #
DE84-001297 ..... N84-13282 #
DE84-001298 ..... N84-13283 #
DE84-001311 ..... N84-13329 #
DE84-001323 ..... N84-13956 #
DE84-001324 ..... N84-13246 #
DE84-001326 ..... N84-13248 #
DE84-001328 ..... N84-13948 #
DE84-001330 ..... N84-13953 #
DE84-001335 ..... N84-13952 #
DE84-001336 ..... N84-13950 #
DE84-001337 ..... N84-13946 #
DE84-001338 ..... N84-13572 #
DE84-001341 ..... N84-13516 #
DE84-001344 ..... N84-13440 #
DE84-001345 ..... N84-13203 #
DE84-001346 ..... N84-13433 #
DE84-001354 ..... N84-13936 #
DE84-001359 ..... N84-14048 #
DE84-001361 ..... N84-13387 #
DE84-001362 ..... N84-14005 #
DE84-001365 ..... N84-13555 #
DE84-001366 ..... N84-14031 #
DE84-001369 ..... N84-13975 #
DE84-001396 ..... N84-13955 #
DE84-001400 ..... N84-13970 #
DE84-001402 ..... N84-13339 #
DE84-001414 ..... N84-14069 #
DE84-001416 ..... N84-13303 #
DE84-001421 ..... N84-13947 #
DE84-001422 ..... N84-13543 #
DE84-001449 ..... N84-13247 #
DE84-001450 ..... N84-14106 #
DE84-001451 ..... N84-13539 #
DE84-001460 ..... N84-14056 #
DE84-001471 ..... N84-13969 #
DE84-001491 ..... N84-14055 #
DE84-001511 ..... N84-13765 #
DE84-001525 ..... N84-13913 #
DE84-001529 ..... N84-13518 #
DE84-001566 ..... N84-13979 #
DE84-001577 ..... N84-13519 #
DE84-001578 ..... N84-14004 #
DE84-001580 ..... N84-13513 #
DE84-001581 ..... N84-13907 #
DE84-001586 ..... N84-13909 #
DE84-001587 ..... N84-13284 #
DE84-001594 ..... N84-14034 #
DE84-001596 ..... N84-13517 #
DE84-001605 ..... N84-14007 #
DE84-001607 ..... N84-13561 #
DE84-001613 ..... N84-13714 #
DE84-001632 ..... N84-13945 #
DE84-001633 ..... N84-13999 #
DE84-001640 ..... N84-13462 #
DE84-001641 ..... N84-13687 #
DE84-001644 ..... N84-13597 #
DE84-001646 ..... N84-14033 #
DE84-001665 ..... N84-13274 #
DE84-001679 ..... N84-13974 #
DE84-001680 ..... N84-13715 #
DE84-001685 ..... N84-13307 #
DE84-001719 ..... N84-13330 #
DE84-001767 ..... N84-13972 #
DE84-001777 ..... N84-13601 #
DE84-001785 ..... N84-13990 #
DE84-001788 ..... N84-13991 #
DE84-001813 ..... N84-13388 #
DE84-001843 ..... N84-13483 #
DE84-001846 ..... N84-13249 #
DE84-001886 ..... N84-13463 #
DE84-001994 ..... N84-13254 #
DE84-002014 ..... N84-13544 #
DE84-002015 ..... N84-13331 #
DE84-002017 ..... N84-13545 #
DE84-002378 ..... N84-13592 #
DE84-017759 ..... N84-13383 #

DOCUMENT-6846 ..... N84-13780 #

DOE/BC-10114/12 ..... N84-13587 #
DOE/BC-10321/12 ..... N84-13324 #

DOE/CS-54266/3 ..... N84-13340 #

DOE/DP-40L52-T3 ..... N84-13570 #
DOE/DP-40L52/T2 ..... N84-14032 #

DOE/EP-0096 ..... N84-13542 #
DOE/EP-40156/1 ..... N84-14025 #

DOE/ER-0145/1 ..... N84-13624 #
DOE/ER-0161 ..... N84-13691 #
DOE/ER-0170 ..... N84-14030 #
DOE/ER-0173 ..... N84-13435 #
DOE/ER-0176 ..... N84-13945 #
DOE/ER-01195/477 ..... N84-13437 #

DOE/ER-01195/478 ..... N84-13837 #
DOE/ER-03992/512 ..... N84-13913 #
DOE/ER-03992/516 ..... N84-14093 #
DOE/ER-10107/17 ..... N84-13283 #
DOE/ER-10107/18 ..... N84-13282 #
DOE/ER-10107/19 ..... N84-13281 #
DOE/ER-10107/20 ..... N84-13618 #
DOE/ER-10107/21 ..... N84-13276 #
DOE/ER-10461/T1 ..... N84-14046 #
DOE/ER-10464/4 ..... N84-13966 #
DOE/ER-10578/T3 ..... N84-13558 #
DOE/ER-10591/T1 ..... N84-13327 #
DOE/ER-10668/3 ..... N84-13975 #
DOE/ER-10881/T2 ..... N84-14059 #
DOE/ER-10948/T1 ..... N84-13591 #
DOE/ER-10964/T1 ..... N84-13240 #
DOE/ER-10964/T2 ..... N84-13514 #
DOE/ER-12010/1 ..... N84-13532 #
DOE/ER-13008/2 ..... N84-13524 #
DOE/ER-30029/T1 ..... N84-13683 #
DOE/ER-52083/T1 ..... N84-13441 #
DOE/ER-70217/T1 ..... N84-13971 #
DOE/ER-71013/T3 ..... N84-13243 #
DOE/ER-71085/T2 ..... N84-13766 #
DOE/ER-109664/T3 ..... N84-13244 #

DOE/ET-10747/T1 ..... N84-13301 #
DOE/ET-51013/89 ..... N84-14018 #
DOE/ET-51013/99 ..... N84-14034 #
DOE/ET-52040/T17 ..... N84-14006 #
DOE/ET-53036/40 ..... N84-14022 #
DOE/ET-53088/94 ..... N84-14099 #
DOE/ET-53088/97 ..... N84-14021 #
DOE/ET-53088/98 ..... N84-14020 #
DOE/ET-53088/103 ..... N84-14024 #
DOE/ET-53088/104 ..... N84-14027 #

DOE/EV-01599/235-PT-1 ..... N84-13761 #
DOE/EV-04361/T4 ..... N84-13937 #
DOE/EV-10468/1 ..... N84-13652 #

DOE/MC-16537/T6 ..... N84-13242 #

DOE/NASA-0131/2 ..... N84-13189* #
DOE/NASA-0189/83-2 ..... N84-14071* #
DOE/NASA-0241/5 ..... N84-13673* #
DOE/NASA-0241/10 ..... N84-13672* #
DOE/NASA-20305-9 ..... N84-13670* #

DOE/NBB-0040 ..... N84-13721 #

DOE/NBM-3016854 ..... N84-13723 #
DOE/NBM-3018226 ..... N84-13654 #

DOE/NV-10162/11 ..... N84-13649 #

DOE/R4-10224-T1 ..... N84-13686 #
DOE/R4-10243/T1 ..... N84-13586 #
DOE/R4/10435/T1 ..... N84-13677 #

DP-MS-83-5 ..... N84-13517 #

DP-1650 ..... N84-13715 #

DPG-TR-83-401 ..... N84-13739 #

DREV-R-4278/82 ..... N84-13711 #

DREV-4287/83 ..... N84-13425 #
DREV-4301/83 ..... N84-13552 #

DRIC-T-8968 ..... N84-13602 #

DRSMI/RH-CR-83-6 ..... N84-13551 #

DT-8152-03 ..... N84-13240 #
DT-8152-04 ..... N84-13244 #

D6-52134 ..... N84-13153* #
D180-27160-1 ..... N84-13671* #
D680-27728-2-VOL-2 ..... N84-13218* #

E-1583 ..... N84-13577* #
E-1719 ..... N84-13685* #
E-1755 ..... N84-13224* #
E-1776 ..... N84-13670* #
E-1828 ..... N84-13610* #
E-1843 ..... N84-13922* #
E-1867 ..... N84-13399* #
E-1890 ..... N84-13924* #
E-1894 ..... N84-13264* #
E-1897 ..... N84-13400* #
E-1909 ..... N84-13188* #
E-1917 ..... N84-13812* #
E-1922 ..... N84-13494* #
E-1928 ..... N84-13140* #
E-1936 ..... N84-13190* #
E-1943 ..... N84-13173* #

EGG-M-00383 ..... N84-13531 #
EGG-M-18083 ..... N84-13273 #

EGG-SAAM-6398 ..... N84-13511 #

EGG-10282-1004 ..... N84-13650 #

EPA-AA-EOD-ES-83/1 ..... N84-13546 #

EPA-450/3-82-018 ..... N84-13696 #
EPA-600/D-83-092 ..... N84-13699 #
EPA-600/D-83-101 ..... N84-13694 #
EPA-600/D-83-105 ..... N84-13775 #
EPA-600/D-83-108 ..... N84-13774 #
EPA-600/3-83-053 ..... N84-13698 #
EPA-600/7-83-050 ..... N84-13695 #

ERD-81-159 ..... N84-13723 #

ESA-TT-759 ..... N84-13143 #
ESA-TT-771 ..... N84-13916 #
ESA-TT-781 ..... N84-13141 #
ESA-TT-785 ..... N84-13142 #
ESA-TT-801 ..... N84-13382 #

ESD-TR-83-027 ..... N84-13421 #
ESD-TR-83-038 ..... N84-13422 #

ESG-DOE-13407 ..... N84-13984 #
ESG-DOE-13408 ..... N84-13979 #

ESL-714505-3 ..... N84-13427 #

ESMC-TR-83-04 ..... N84-13217 #

ETL-0331 ..... N84-13419 #

E84-10002 ..... N84-13627* #
E84-10034 ..... N84-13628* #
E84-10036 ..... N84-13629* #
E84-10037 ..... N84-13630* #
E84-10038 ..... N84-13631* #
E84-10039 ..... N84-13632* #
E84-10040 ..... N84-13633* #
E84-10041 ..... N84-13634* #
E84-10042 ..... N84-13635* #
E84-10043 ..... N84-13636* #
E04-10044 ..... N84-13637* #
E84-10045 ..... N84-13638* #
E84-10046 ..... N84-13639* #
E84-10047 ..... N84-13640* #
E84-10048 ..... N84-13641* #
E84-10049 ..... N84-13642* #
E84-10050 ..... N84-13643* #

FAA-AMS-220 ..... N84-13147 #

FAA-PM-83-9 ..... N84-13171 #
FAA-PM-83-30 ..... N84-13181 #

FERMILAB/TM-1205 ..... N84-13983 #
FERMILAB/TM-1206 ..... N84-13386 #

FFA-138 ..... N84-13155 #

FFC/CP-83-10 ..... N84-14018 #

FHWA/TX-83/7 ..... N84-13389 #

FIGCBT/DOC-1 ..... N84-13780 #

FR-1 ..... N84-13453 #
FR-2 ..... N84-13456 #
FR-3 ..... N84-13454 #

FRA-0RD-80-40.111 ..... N84-13340 #

FRP-82/17 ..... N84-13266 #

FSGTR/INT-150 ..... N84-13669 #

FSRB/INT-32 ..... N84-13667 #

FSRB/SO-85 ..... N84-13665 #
FSRB/SO-91 ..... N84-13664 #
FSRB/SO-92 ..... N84-13662 #
FSRB/SO-93 ..... N84-13668 #
FSRB/SO-94 ..... N84-13666 #

FSRP-23-236 ..... N84-13663 #

FTD-ID(RS)T-408-83 ..... N84-13449 #
FTD-ID(RS)T-0346-83 ..... N84-13549 #
FTD-ID(RS)T-0347-83 ..... N84-13807 #
FTD-ID(RS)T-0593-83 ..... N84-13333 #
FTD-ID(RS)T-0762-83 ..... N84-13216 #
FTD-ID(RS)T-1018-83 ..... N84-13334 #
FTD-ID(RS)T-1091-83 ..... N84-14037 #
FTD-ID(RS)T-1096-83 ..... N84-13451 #

GA-A-17018 ..... N84-14014 #
GA-A-17175 ..... N84-14040 #

GC-TR-83-286 ..... N84-13583 #

GD-14 ..... N84-13724 #

GJBX-36(83) ..... N84-13647 #

GL-3634 ..... N84-13548* #

GPO-26-859 ..... N84-13170 #

H-83-03 ..... N84-13208* #

HDL-CR-83-076-1 ..... N84-13313 #

HSER-8856 ..... N84-13186*

ICASE-83-65 ..... N84-13493* #

IL/SGS/IMN-87 ..... N84-13725 #

INPE-2750-PRE/326 ..... N84-13884 #
INPE-2754-PRE/330 ..... N84-13209 #
INPE-2769-PRE/342 ..... N84-13883 #
INPE-2792-TDL/138 ..... N84-13446 #
INPE-2794-PRE/356 ..... N84-13445 #
INPE-2882-RPE/443 ..... N84-13640* #
INPE-2885-PRE/407 ..... N84-14083 #
INPE-2894-PRE/413 ..... N84-13813 #
INPE-2896-PRE/415 ..... N84-13639* #
INPE-2897-PRE/416 ..... N84-13707 #

IOE/CE-83-02 ..... N84-13392 #

IPL-TR-033 ..... N84-13824 #

IR-3 ..... N84-13166 #

IS-M-441 ..... N84-13930 #
IS-M-443 ..... N84-13620 #
IS-M-444 ..... N84-13928 #
IS-M-448 ..... N84-13621 #
IS-M-456 ..... N84-13599 #

IS-N-449 ..... N84-13598 #

ISBN-0-7988-1489-6 ..... N84-13535 #
ISBN-0-7988-1717-8 ..... N84-13733 #
ISBN-0-7988-2049-7 ..... N84-13311 #
ISBN-0-7988-2053-5 ..... N84-13734 #
ISBN-0-7988-2202-3 ..... N84-13805 #
ISBN-0-7988-2210-4 ..... N84-13579 #
ISBN-0-7988-2211-2 ..... N84-14064 #
ISBN-0-7988-2325-9 ..... N84-13776 #
ISBN-0-7988-2367-4 ..... N84-13806 #
ISBN-0-7988-2410-7 ..... N84-13236 #
ISBN-0-7988-2419-0 ..... N84-13235 #
ISBN-0-7988-2520-0 ..... N84-13233 #
ISBN-0-7988-2547-2 ..... N84-13444 #
ISBN-0-7988-2559-6 ..... N84-13234 #
ISBN-0-7988-2606-1 ..... N84-13192 #
ISBN-951-752-966-X ..... N84-13175 #

ISSN-0066-1953 ..... N84-13783
ISSN-0081-3397 ..... N84-13815 #
ISSN-0081-3397 ..... N84-13816 #
ISSN-0081-3397 ..... N84-13915 #
ISSN-0089-4010 ..... N84-13871 #
ISSN-0149-1776 ..... N84-13724 #
ISSN-0333-5897 ..... N84-13499 #
ISSN-0358-2620 ..... N84-13175 #
ISSN-0389-4010 ..... N84-13154 #
ISSN-0389-4010 ..... N84-13200 #
ISSN-0389-4010 ..... N84-13213 #
ISSN-0389-4010 ..... N84-13495 #
ISSN-0389-4010 ..... N84-13611 #
ISSN-0389-4010 ..... N84-13872 #
ISSN-0389-4041 ..... N84-13612 #

ISVR-TR-121 ..... N84-13613 #

JEN-542 ..... N84-13915 #
JEN-545 ..... N84-13815 #
JEN-549 ..... N84-13816 #

JPL-TDA-PR-42-75 ..... N84-13401* #

K/CSD-TM-48 ..... N84-13647 #

L-15582 ..... N84-13161* #
L-15609 ..... N84-13152* #
L-15619 ..... N84-13172* #
L-15629 ..... N84-13163* #
L-15632 ..... N84-13182* #
L-15648 ..... N84-13165* #
L-15652 ..... N84-13923* #
L-15658 ..... N84-13614* #
L-15670 ..... N84-13500* #
L-15675 ..... N84-13164* #
L-15685 ..... N84-13162* #
L-15689 ..... N84-[illegible]978* #
L-15702 ..... N84-[illegible]160* #
L-15720 ..... N84-13[illegible]6* #

LA-TR-83-14 ..... N84-13525 #

LA-UR-83-2249 ..... N84-14057 #
LA-UR-83-2311 ..... N84-14013 #
LA-UR-83-2329 ..... N84-14091 #
LA-UR-83-2368 ..... N84-14097 #
LA-UR-83-2379 ..... N84-14051 #
LA-UR-83-2445 ..... N84-13478 #
LA-UR-83-2486 ..... N84-14092 #
LA-UR-83-2493 ..... N84-13850 #
LA-UR-83-2568 ..... N84-13555 #
LA-UR-83-2570 ..... N84-14031 #
LA-UR-83-2572 ..... N84-14048 #
LA-UR-83-2579 ..... N84-13387 #
LA-UR-83-2580 ..... N84-14005 #
LA-UR-83-2593 ..... N84-13936 #
LA-UR-83-2601 ..... N84-14003 #
LA-UR-83-2602 ..... N84-13433 #
LA-UR-83-2610 ..... N84-13203 #
LA-UR-83-2622 ..... N84-13440 #
LA-UR-83-2646 ..... N84-13516 #
LA-UR-83-2665 ..... N84-13572 #
LA-UR-83-2669 ..... N84-13946 #
LA-UR-83-2670 ..... N84-13950 #
LA-UR-83-2671 ..... N84-13956 #
LA-UR-83-2678 ..... N84-13863 #
LA-UR-83-2689 ..... N84-13246 #
LA-UR-83-2702 ..... N84-13953 #
LA-UR-83-2703 ..... N84-13952 #
LA-UR-83-2742 ..... N84-13329 #
LA-UR-83-2840 ..... N84-13560 #
LA-UR-83-2844 ..... N84-14105 #
LA-UR-83-2851 ..... N84-13942 #
LA-UR-83-2862 ..... N84-13901 #
LA-UR-83-2886 ..... N84-13255 #
LA-UR-83-2890 ..... N84-13307 #
LA-UR-83-2929 ..... N84-13330 #

LA-9788-MS ..... N84-14023 #
LA-9814-MS ..... N84-13439 #
LA-9830-MS ..... N84-13564 #
LA-9840-MS ..... N84-13719 #
LA-9842-MS ..... N84-13681 #

LARS-CR-110963 ..... N84-13629* #

LBL-15122 ..... N84-13475 #
LBL-15616 ..... N84-13948 #
LBL-15751 ..... N84-13520 #
LBL-15786 ..... N84-13251 #
LBL-15868 ..... N84-13973 #
LBL-15918-REV ..... N84-13994 #
LBL-15985 ..... N84-13248 #
LBL-16027 ..... N84-13468 #
LBL-16031 ..... N84-13540 #
LBL-16106 ..... N84-13538 #
LBL-16217 ..... N84-13467 #
LBL-16235 ..... N84-13245 #
LBL-16390 ..... N84-13943 #
LBL-16449 ..... N84-13250 #
LBL-16452 ..... N84-13680 #
LBL-16470 ..... N84-14049 #
LBL-16483 ..... N84-13961 #
LBL-16505 ..... N84-13384 #
LBL-16556 ..... N84-13462 #
LBL-16557 ..... N84-13249 #
LBL-16558 ..... N84-14044 #
LBL-16596 ..... N84-13253 #
LBL-16726 ..... N84-13274 #

LC-83-60004-1 ..... N84-13547 #
LC-83-60011-2 ..... N84-13593 #

LG83ER0163 ..... N84-13159* #
LG83ER0164 ..... N84-13158* #

LIDS-P-1307 ..... N84-13423 #

LLL/M-146 ..... N84-13843 #

LMSC-D-876763 ..... N84-13685 #

LMSC-HREC-TR-D784124 ..... N84-13551 #

LNR-400 ..... N84-13398* #

LR-30555 ..... N84-13223* #

MDC-Q0798 ..... N84-13318 #

MEG/2302 ..... N84-13535 #

MERADCOM-2375 ..... N84-14072 #
MERADCOM-2380 ..... N84-13335 #

MIT/LCS/TM-232 ..... N84-13889 #
MIT/LCS/TM-236 ..... N84-13450 #
MIT/LCS/TM-237 ..... N84-13820 #

MIT/LCS/TR-282 ..... N84-13823 #
MIT/LCS/TR-285 ..... N84-13891 #
MIT/LCS/TR-287 ..... N84-13892 #

MLM-3105(OP) ..... N84-13559 #
MLM-3106(OP) ..... N84-13231 #

MP-SL-83-12 ..... N84-13654 #

MRDC41131.3SA ..... N84-13457 #

MSSA02-SYS-R003 ..... N84-13710 #

NAA-CR-168193 ..... N84-13218* #

NADC-82211-60 ..... N84-13225 #

NAL-TR-752 ..... N84-13154 #
NAL-TR-753 ..... N84-13611 #
NAL-TR-754 ..... N84-13612 #
NAL-TR-756 ..... N84-13213 #
NAL-TR-758 ..... N84-13871 #
NAL-TR-760 ..... N84-13872 #
NAL-TR-763 ..... N84-13495 #
NAL-TR-765 ..... N84-13200 #

NAMRL-1297 ..... N84-13183 #

NAS 1.15:82554 ..... N84-13205* #
NAS 1.15:82559 ..... N84-13933* #
NAS 1.15:82561 ..... N84-13756* #
NAS 1.15:83460 ..... N84-13670* #
NAS 1.15:83495 ..... N84-13610* #
NAS 1.15:83503 ..... N84-13922* #
NAS 1.15:83518 ..... N84-13399* #
NAS 1.15:83525 ..... N84-13924* #
NAS 1.15:83528 ..... N84-13264* #
NAS 1.15:83531 ..... N84-13400* #
NAS 1.15:83538 ..... N84-13186* #
NAS 1.15:83540 ..... N84-14061* #
NAS 1.15:83545 ..... N84-13812* #
NAS 1.15:83548 ..... N84-13494* #
NAS 1.15:83553 ..... N84-13140* #
NAS 1.15:83558 ..... N84-13190* #
NAS 1.15:83564 ..... N84-13173* #
NAS 1.15:83958 ..... N84-14103* #
NAS 1.15:84395 ..... N84-13178* #
NAS 1.15:84406 ..... N84-13985* #
NAS 1.15:84579 ..... N84-13151* #
NAS 1.15:84969 ..... N84-13735* #
NAS 1.15:84982 ..... N84-13705* #
NAS 1.15:85118 ..... N84-14082* #
NAS 1.15:85481 ..... N84-13636* #
NAS 1.15:85655 ..... N84-13161* #
NAS 1.15:85668 ..... N84-13172* #
NAS 1.15:85685 ..... N84-13866* #
NAS 1.15:85691 ..... N84-13138* #
NAS 1.15:85697 ..... N84-13608* #
NAS 1.15:85701 ..... N84-13139* #
NAS 1.15:85715 ..... N84-13309* #
NAS 1.15:85718 ..... N84-13211* #
NAS 1.15:85723 ..... N84-13150* #
NAS 1.15:85733 ..... N84-13576* #
NAS 1.15:85847 ..... N84-14096* #
NAS 1.15:85852 ..... N84-13177* #
NAS 1.15:85857 ..... N84-13886* #
NAS 1.15:85863 ..... N84-13176* #
NAS 1.15:86244 ..... N84-13206* #
NAS 1.21:7011(251) ..... N84-13767* #
NAS 1.21:7037(167) ..... N84-13137* #
NAS 1.21:7037(168) ..... N84-13136* #
NAS 1.21:7046(09) ..... N84-13204* #
NAS 1.26:3699 ..... N84-13194* #
NAS 1.26:3731 ..... N84-13501* #
NAS 1.26:3737 ..... N84-13730* #
NAS 1.26:3742 ..... N84-13195* #
NAS 1.26:3751 ..... N84-13208* #

NAS 1.26:3752 ..... N84-13736* #
NAS 1.26:17253 ..... N84-13380* #
NAS 1.26:84618 ..... N84-13160* #
NAS 1.26:166528 ..... N84-13159* #
NAS 1.26:166529 ..... N84-13158* #
NAS 1.26:166533 ..... N84-13157* #
NAS 1.26:168176 ..... N84-13193* #
NAS 1.26:168178 ..... N84-14071* #
NAS 1.26:168193 ..... N84-13218* #
NAS 1.26:168196 ..... N84-13443* #
NAS 1.26:168227 ..... N84-13332* #
NAS 1.26:168233 ..... N84-13310* #
NAS 1.26:168239 ..... N84-13673* #
NAS 1.26:168254 ..... N84-13398* #
NAS 1.26:168258 ..... N84-13186* #
NAS 1.26:168260 ..... N84-13265* #
NAS 1.26:168278 ..... N84-13189* #
NAS 1.26:168283 ..... N84-13490* #
NAS 1.26:168293 ..... N84-13187* #
NAS 1.26:168294 ..... N84-13672* #
NAS 1.26:170405 ..... N84-13197* #
NAS 1.26:170908 ..... N84-13731* #
NAS 1.26:170909 ..... N84-13732* #
NAS 1.26:170919 ..... N84-13207* #
NAS 1.26:171715 ..... N84-13635* #
NAS 1.26:171783 ..... N84-13671* #
NAS 1.26:172142 ..... N84-13212* #
NAS 1.26:172160 ..... N84-13781* #
NAS 1.26:172200 ..... N84-13153* #
NAS 1.26:172225 ..... N84-13607* #
NAS 1.26:172246 ..... N84-13223* #
NAS 1.26:172251 ..... N84-13492* #
NAS 1.26:172255 ..... N84-13609* #
NAS 1.26:172269 ..... N84-13221* #
NAS 1.26:172270 ..... N84-13222* #
NAS 1.26:172275 ..... N84-13493* #
NAS 1.26:174496 ..... N84-13491* #
NAS 1.26:174513 ..... N84-13639* #
NAS 1.26:174517 ..... N84-13627* #
NAS 1.26:174586 ..... N84-13628* #
NAS 1.26:174588 ..... N84-13629* #
NAS 1.26:174589 ..... N84-13630* #
NAS 1.26:174590 ..... N84-13631* #
NAS 1.26:174591 ..... N84-13632* #
NAS 1.26:174592 ..... N84-13633* #
NAS 1.26:174593 ..... N84-13634* #
NAS 1.26:174606 ..... N84-13548* #
NAS 1.26:174607 ..... N84-13688* #
NAS 1.26:174608 ..... N84-14098* #
NAS 1.26:174609 ..... N84-13149* #
NAS 1.26:174610 ..... N84-13401* #
NAS 1.26:174611 ..... N84-13637* #
NAS 1.26:174612 ..... N84-13638* #
NAS 1.26:174614 ..... N84-13640* #
NAS 1.26:174615 ..... N84-13641* #
NAS 1.26:174616 ..... N84-13643* #
NAS 1.26:174617 ..... N84-13642* #
NAS 1.26:174618 ..... N84-13704* #
NAS 1.55:2292 ..... N84-13706* #
NAS 1.60:2122 ..... N84-13182* #
NAS 1.60:2128 ..... N84-13198* #
NAS 1.60:2193 ..... N84-13885* #
NAS 1.60:2197 ..... N84-13923* #
NAS 1.60:2205 ..... N84-13152* #
NAS 1.60:2226 ..... N84-13614* #
NAS 1.60:2228 ..... N84-13163* #
NAS 1.60:2234 ..... N84-13165* #
NAS 1.60:2235 ..... N84-13164* #
NAS 1.60:2236 ..... N84-13263* #
NAS 1.60:2239 ..... N84-13224* #
NAS 1.60:2242 ..... N84-13978* #
NAS 1.60:2245 ..... N84-13500* #
NAS 1.60:2251 ..... N84-13162* #
NAS 1.60:2257 ..... N84-13577* #
NAS 1.61:1108 ..... N84-13397* #

NASA-CP-2292 ..... N84-13706* #

NASA-CR-3699 ..... N84-13194* #
NASA-CR-3731 ..... N84-13501* #
NASA-CR-3737 ..... N84-13730* #
NASA-CR-3742 ..... N84-13195* #
NASA-CR-3751 ..... N84-13208* #
NASA-CR-3752 ..... N84-13736* #
NASA-CR-17253 ..... N84-13380* #
NASA-CR-166528 ..... N84-13159* #
NASA-CR-166529 ..... N84-13158* #
NASA-CR-166533 ..... N84-13157* #
NASA-CR-168176 ..... N84-13193* #
NASA-CR-168178 ..... N84-14071* #
NASA-CR-168196 ..... N84-13443* #
NASA-CR-168227 ..... N84-13332* #
NASA-CR-168233 ..... N84-13310* #
NASA-CR-168239 ..... N84-13673* #
NASA-CR-168254 ..... N84-13398* #
NASA-CR-168258 ..... N84-13186*

NASA-CR-168260 N84-13265* #
NASA-CR-168278 N84-13189* #
NASA-CR-168283 N84-13490* #
NASA-CR-168293 N84-13187* #
NASA-CR-168294 N84-13672* #
NASA-CR-170405 N84-13197* #
NASA-CR-170908 N84-13731* #
NASA-CR-170909 N84-13732* #
NASA-CR-170919 N84-13207* #
NASA-CR-171715 N84-13635* #
NASA-CR-171783 N84-13671* #
NASA-CR-172142 N84-13212* #
NASA-CR-172160 N84-13781* #
NASA-CR-172200 N84-13153* #
NASA-CR-172225 N84-13607* #
NASA-CR-172246 N84-13223* #
NASA-CR-172251 N84-13492* #
NASA-CR-172255 N84-13609* #
NASA-CR-172269 N84-13221* #
NASA-CR-172270 N84-13222* #
NASA-CR-172275 N84-13493* #
NASA-CR-174496 N84-13491* #
NASA-CR-174513 N84-13639* #
NASA-CR-174517 N84-13627* #
NASA-CR-174586 N84-13628* #
NASA-CR-174588 N84-13629* #
NASA-CR-174589 N84-13630* #
NASA-CR-174590 N84-13631* #
NASA-CR-174591 N84-13632* #
NASA-CR-174592 N84-13633* #
NASA-CR-174593 N84-13634* #
NASA-CR-174606 N84-13548* #
NASA-CR-174607 N84-13688* #
NASA-CR-174608 N84-14098* #
NASA-CR-174609 N84-13149* #
NASA-CR-174610 N84-13401* #
NASA-CR-174611 N84-13637* #
NASA-CR-174612 N84-13638* #
NASA-CR-174614 N84-13640* #
NASA-CR-174615 N84-13641* #
NASA-CR-174616 N84-13643* #
NASA-CR-174617 N84-13642* #
NASA-CR-174618 N84-13704* #

NASA-RP-1108 N84-13397* #

NASA-SP-7011(251) N84-13767* #
NASA-SP-7037(167) N84-13137* #
NASA-SP-7037(168) N84-13136* #
NASA-SP-7046(09) N84-13204* #

NASA-TM-82554 N84-13205* #
NASA-TM-82559 N84-13933* #
NASA-TM-82561 N84-13756* #
NASA-TM-83460 N84-13670* #
NASA-TM-83495 N84-13610* #
NASA-TM-83503 N84-13922* #
NASA-TM-83518 N84-13399* #
NASA-TM-83525 N84-13924* #
NASA-TM-83528 N84-13264* #
NASA-TM-83531 N84-13400* #
NASA-TM-83538 N84-13188* #
NASA-TM-83540 N84-14061* #
NASA-TM-83545 N84-13812* #
NASA-TM-83548 N84-13494* #
NASA-TM-83553 N84-13140* #
NASA-TM-83558 N84-13190* #
NASA-TM-83564 N84-13173* #
NASA-TM-83958 N84-14103* #
NASA-TM-84395 N84-13178* #
NASA-TM-84406 N84-13985* #
NASA-TM-84579 N84-13151* #
NASA-TM-84618 N84-13160* #
NASA-TM-84969 N84-13735* #
NASA-TM-84982 N84-13705* #
NASA-TM-85118 N84-14082* #
NASA-TM-85481 N84-13636* #
NASA-TM-85655 N84-13161* #
NASA-TM-85668 N84-13172* #
NASA-TM-85685 N84-13866* #
NASA-TM-85691 N84-13138* #
NASA-TM-85697 N84-13608* #
NASA-TM-85701 N84-13139* #
NASA-TM-85715 N84-13309* #
NASA-TM-85718 N84-13211* #
NASA-TM-85723 N84-13150* #
NASA-TM-85733 N84-13576* #
NASA-TM-85847 N84-14096* #
NASA-TM-85852 N84-13177* #
NASA-TM-85857 N84-13886* #
NASA-TM-85863 N84-13176* #
NASA-TM-86244 N84-13206* #

NASA-TP-2122 N84-13182* #
NASA-TP-2128 N84-13198* #
NASA-TP-2193 N84-13885* #
NASA-TP-2197 N84-13923* #
NASA-TP-2205 N84-13152* #
NASA-TP-2226 N84-13614* #
NASA-TP-2228 N84-13163* #
NASA-TP-2234 N84-13165* #
NASA-TP-2235 N84-13184* #
NASA-TP-2236 N84-13263* #
NASA-TP-2239 N84-13224* #
NASA-TP-2242 N84-13978* #
NASA-TP-2245 N84-13500* #
NASA-TP-2251 N84-13162* #
NASA-TP-2257 N84-13577* #

NATC-TM-83-1-SY N84-13184 #

NBS-TN-1180 N84-13782 #

NBSIR-81-2253 N84-13256 #
NBSIR-83-2727 N84-13390 #
NBSIR-83-2740 N84-13856 #
NBSIR-83-2749 N84-13395 #
NBSIR-83-2757 N84-13657 #
NBSIR-83-2757 N84-13857 #

NCS-TIB-83-4-VOL-1 N84-13432 #
NCS-TIB-83-4-VOL-2 N84-13431 #

NEAR-TR-305 N84-13166 #

NIAST-82/78 N84-13192 #

NIMH-83-310 N84-13779 #

NOAA-TM-ERL-PMEL-45 N84-13753 #
NOAA-TM-ERL-PMEL-48 N84-13661 #

NOAA-TM-ERL-WPL-111 N84-13931 #
NOAA-TM-ERL-WPL-112 N84-13726 #

NOAA-TM-NWS-WR-179 N84-13746 #

NOAA-83080903 N84-13746 #
NOAA-83081101 N84-13724 #
NOAA-83081102 N84-13674* #
NOAA-83081103 N84-13931 #
NOAA-83081104 N84-13726 #
NOAA-83081105 N84-13753 #
NOAA-83081106 N84-13661 #
NOAA-83082301 N84-13745 #
NOAA-83082302 N84-13747 #
NOAA-83082409 N84-13748 #

NOAA/TR/NESDIS-1 N84-13745 #

NOO-TR-270 N84-13899 #

NORDA-TN-226 N84-13749 #

NOSC/TD-598 N84-14107 #

NPS61-83-002 N84-13925 #

NRL-MR-5089 N84-13565 #
NRL-MR-5134 N84-13430 #
NRL-MR-5147 N84-13510 #
NRL-MR-5157 N84-13986 #
NRL-MR-5160 N84-13646 #
NRL-MR-5168 N84-13708 #
NRL-MR-5170 N84-13556 #
NRL-MR-5175 N84-13645 #
NRL-MR-5184 N84-13470 #
NRL-MR-5205 N84-13483 #

NRL-8667 N84-13420 #
NRL-8707 N84-13426 #
NRL-8731 N84-13896 #
NRL-8741 N84-13927 #

NSF/CEE-82062 N84-13391 #
NSF/CEE-82117 N84-13308 #
NSF/CEE-82118 N84-13623 #

NSWC/MP-82-572 N84-13227 #

NSWC/TR-83-90 N84-13935 #

NTIA/REPORT-83-124 N84-13442 #

NTSB/AAR-83/05 N84-13169 #
NTSB/AAR-83/07 N84-13168 #

NUSC-TR-6921 N84-13895 #

NYSERDA-83-6 N84-13659 #

ONERA-1982-4 N84-13141 #
ONERA-1982-5 N84-13142 #

ONRL-C-9-83 N84-13536 #
ONRL-C-10-83 N84-14039 #
ONRL-C-11-83 N84-13455 #

ONRL-R-6-83 N84-13226 #

ONWI-448 N84-13651 #

ORC-79-11 N84-13596 #
ORC-83-1 N84-13898 #

ORNL-5819 N84-13909 #
ORNL-5967 N84-13907 #
ORNL-5975 N84-14045 #

ORNL/CON-80/R1 N84-13519 #
ORNL/CON-119 N84-13592 #

ORNL/CSD-122 N84-13284 #

ORNL/SUB-80-7800-1 N84-13513 #

ORNL/TM-8750 N84-14001 #
ORNL/TM-8806 N84-14000 #
ORNL/TM-8815 N84-14004 #
ORNL/TM-8827 N84-13759 #
ORNL/TM-8830 N84-13286 #

OSD/FSTC-83/105 N84-13853 #
OSD/FSTC-83/106 N84-13854 #
OSD/FSTC-83/185 N84-13855 #
OSD/FSTC-83/201 N84-13851 #
OSD/FSTC-83/210 N84-13858 #
OSD/FSTC-83/211 N84-13859 #
OSD/FSTC-83/221 N84-13852 #

OWRT-A-086-ALA(1) N84-13257 #

OWRT-B-085-HI(1) N84-13394 #
OWRT-B-122-NEV(1) N84-13658 #

PAR-83-1 N84-13987 #

PB82-240945 N84-13852 #
PB83-237487 N84-13546 #
PB83-238204 N84-13389 #
PB83-239582 N84-13390 #
PB83-240424 N84-13547 #
PB83-240962 N84-13853 #
PB83-241075 N84-13854 #
PB83-241513 N84-13855 #
PB83-241596 N84-13851 #
PB83-243634 N84-13392 #
PB83-245043 N84-13442 #
PB83-245829 N84-13308 #
PB83-246116 N84-13775 #
PB83-246132 N84-13774 #
PB83-247411 N84-13694 #
PB83-247981 N84-13391 #
PB83-248369 N84-13394 #
PB83-248690 N84-13726 #
PB83-248708 N84-13661 #
PB83-248807 N84-13659 #
PB83-248815 N84-13780 #
PB83-248823 N84-13753 #
PB83-249375 N84-13660 #
PB83-249664 N84-13257 #
PB83-249698 N84-13658 #
PB83-249714 N84-13856 #
PB83-249730 N84-13724 #
PB83-249763 N84-13664 #
PB83-249789 N84-13256 #
PB83-249904 N84-13746 #
PB83-249961 N84-13668 #
PB83-249987 N84-13623 #
PB83-249995 N84-13665 #
PB83-250019 N84-14070 #
PB83-250100 N84-13593 #
PB83-250191 N84-13698 #
PB83-250308 N84-13699 #
PB83-250415 N84-13674* #
PB83-250464 N84-13779 #
PB83-250522 N84-13931 #
PB83-250589 N84-13782 #
PB83-250753 N84-13666 #
PB83-250852 N84-13656 #
PB83-251009 N84-13696 #
PB83-251124 N84-13669 #
PB83-251140 N84-13725 #
PB83-251157 N84-13667 #
PB83-251215 N84-13393 #
PB83-251314 N84-13662 #
PB83-251348 N84-13657 #
PB83-251348 N84-13857 #

PB83-251447 ..... N84-13395 #
PB83-252460 ..... N84-13147 #
PB83-252510 ..... N84-13747 #
PB83-252759 ..... N84-13663 #
PB83-252825 ..... N84-13697 #
PB83-252908 ..... N84-13745 #
PB83-252932 ..... N84-13748 #
PB83-254805 ..... N84-13858 #
PB83-254813 ..... N84-13859 #
PB83-261669 ..... N84-13695 #
PB83-910405 ..... N84-13169 #
PB83-910407 ..... N84-13168 #

PFC/RR-83-28 ..... N84-14034 #

PNL-SA-10932 ..... N84-13325 #
PNL-SA-10954 ..... N84-13762 #
PNL-SA-11013 ..... N84-13763 #
PNL-SA-11138 ..... N84-13289 #
PNL-SA-11141 ..... N84-13752 #
PNL-SA-11189 ..... N84-13571 #
PNL-SA-11320 ..... N84-14026 #
PNL-SA-11321 ..... N84-13302 #
PNL-SA-11364 ..... N84-13304 #
PNL-SA-11365 ..... N84-13303 #
PNL-SA-11425 ..... N84-13291 #
PNL-SA-11444 ..... N84-13836 #
PNL-SA-11512 ..... N84-14069 #
PNL-SA-11537 ..... N84-13653 #
PNL-SA-11555 ..... N84-13944 #

PNL-4623 ..... N84-13388 #
PNL-4796 ..... N84-13720 #

PPG-711 ..... N84-13998 #

PPSP-MP-50 ..... N84-13660 #

PR-4 ..... N84-13628* #

PUB-41083 ..... N84-13658 #

PUBL-340 ..... N84-13499 #

QFT-7 ..... N84-13894 #

QR-2 ..... N84-13643* #
QR-4 ..... N84-13638* #
QR-9 ..... N84-13673* #
QR-10 ..... N84-13672* #

QTPR-7 ..... N84-13242 #

R/PERS-626 ..... N84-13777 #

RADC-TR-83-50 ..... N84-13987 #
RADC-TR-83-80 ..... N84-13827 #
RADC-TR-83-114 ..... N84-13424 #
RADC-TR-83-119 ..... N84-13417 #

RAE-TRANS-2098 ..... N84-13312 #
RAE-TRANS-2102 ..... N84-13381 #

RCC/MG-104-83 ..... N84-13737 #
RCC/MG-365-83 ..... N84-13738 #
RCC/MG-366-83 ..... N84-13737 #

REPT-83-A1-SER-A ..... N84-13175 #

RSL-601-1 ..... N84-13635* #

S-1585 ..... N84-13195* #

SAI-82-1014/PRI-63 ..... N84-13561 #
SAI-83-1033/PRI-64 ..... N84-14007 #
SAI-83-1034/PRI-65 ..... N84-13999 #
SAI-02383-454LJ/APPAT-4 ..... N84-14019 #

SAM-TR-82-47 ..... N84-13771 #

SAND-82-1040 ..... N84-13622 #
SAND-82-1425 ..... N84-13474 #
SAND-82-2498 ..... N84-13290 #
SAND-82-2903C ..... N84-13323 #
SAND-82-2961 ..... N84-13840 #
SAND-83-0011 ..... N84-13846 #
SAND-83-0223C ..... N84-134u5 #
SAND-83-0263 ..... N84-13541 #
SAND-83-0541C ..... N84-14029 #
SAND-83-0564C ..... N84-14010 #
SAND-83-0590C ..... N84-13940 #
SAND-83-0607C ..... N84-13949 #
SAND-83-0608C ..... N84-13939 #
SAND-83-0609C ..... N84-14012 #
SAND-83-0610C ..... N84-13951 #
SAND-83-0971 ..... N84-13597 #
SAND-83-1043C ..... N84-13523 #
SAND-83-1045C ..... N84-13481 #
SAND-83-1120C ..... N84-13585 #
SAND-83-1303C ..... N84-13960 #
SAND-83-1334C ..... N84-13563 #
SAND-83-1372C ..... N84-13619 #
SAND-83-1773C ..... N84-13977 #
SAND-83-1844C ..... N84-13522 #
SAND-83-1898 ..... N84-13714 #
SAND-83-1963C ..... N84-13954 #
SAND-83-2084C ..... N84-13328 #
SAND-83-2094C ..... N84-13239 #
SAND-83-2109C ..... N84-13515 #
SAND-83-2134C ..... N84-13297 #
SAND-83-2135C ..... N84-13655 #
SAND-83-2219C ..... N84-13687 #
SAND-83-7021 ..... N84-13678 #
SAND-83-7024 ..... N84-13679 #
SAND-83-7108 ..... N84-13463 #
SAND-83-7122 ..... N84-13473 #
SAND-83-8029 ..... N84-13839 #

SD-TR-83-48 ..... N84-13428 #

SERI/STR-214-1708 ..... N84-13744 #
SERI/STR-214-1997 ..... N84-13675 #
SERI/STR-231-1898 ..... N84-13757 #
SERI/STR-254-1515 ..... N84-13682 #

SERI/TP-235-1987 ..... N84-13758 #

SERI/TR-252-1912 ..... N84-13530 #
SERI/TR-255-1627 ..... N84-13676 #

SLAC-PUB-3113 ..... N84-14016 #

SLAC/AP-3 ..... N84-13482 #
SLAC/AP-6 ..... N84-13955 #

SORI-EAS-81-232 ..... N84-13695 #

SR-K3-04438 ..... N84-13635* #

SR-1 ..... N84-13740 #
SR-3 ..... N84-13460 #

SU-CMR-83-9 ..... N84-13988 #

SU-SLAC-PUB-3102 ..... N84-13965 #
SU-SLAC-PUB-3116 ..... N84-13919 #
SU-SLAC-PUB-3120 ..... N84-13976 #
SU-SLAC-PUB-3127 ..... N84-13968 #
SU-SLAC-PUB-3213 ..... N84-14055 #

SU-TR-337 ..... N84-13906 #

SUIPR-961 ..... N84-14098* #

SWRI-5361-003 ..... N84-13340 #
SWRI-6648/1 ..... N84-13225 #
SWRI-6682/2 ..... N84-13332* #
SWRI-6800-148/2 ..... N84-13337 #

TACOM-TR-12726 ..... N84-13582 #
TACOM-TR-12758 ..... N84-13581 #

TOP-7-3-507 ..... N84-13146 #

TR-A-23 ..... N84-13900 #
TR-A-25 ..... N84-13831 #

TR-2 ..... N84-13321 #
TR-4 ..... N84-13315 #
TR-10 ..... N84-14041 #
TR-11 ..... N84-13897 #
TR-18 ..... N84-13269 #
TR-18 ..... N84-13881 #
TR-30 ..... N84-13887 #
TR-52 ..... N84-13616 #
TR-78 ..... N84-13882 #
TR-82 ..... N84-13905 #
TR-83-3 ..... N84-13822 #
TR-99 ..... N84-13825 #
TR-112-15 ..... N84-13772 #
TR-113 ..... N84-13890 #
TR-152 ..... N84-13394 #
TR-629 ..... N84-13422 #
TR-821S ..... N84-13880 #
TR-0083(3925-04)-1 ..... N84-13428 #

TSI-83-16-VOL-1 ..... N84-13432 #
TSI-83-19-VOL-2 ..... N84-13431 #

TVA/OP/EDT-83/19 ..... N84-13322 #

U-OF-IOWA-83-25 ..... N84-13996 #
UC-MIE-050183-15-ONR ..... N84-13821 #
UC-MIE-070183-16-ONR ..... N84-13580 #

UCB/EERC-82/25 ..... N84-13393 #
UCB/EERC-82/26 ..... N84-13308 #
UCB/EERC-82/27 ..... N84-13623 #

UCB/EERC/82/20 ..... N84-13391 #

UCID-19824 ..... N84-13600 #
UCID-19849 ..... N84-13230 #
UCID-19873 ..... N84-13845 #
UCID-19877-PT-1 ..... N84-13438 #
UCID-19880 ..... N84-13625 #
UCID-19881 ..... N84-13228 #
UCID-19887 ..... N84-13835 #
UCID-19889 ..... N84-13809 #
UCID-30195 ..... N84-13865 #

UCRL-53391 ..... N84-13957 #
UCRL-53439 ..... N84-14067 #
UCRL-86557-83 ..... N84-13589 #
UCRL-88649-REV-2 ..... N84-13689 #
UCRL-88668 ..... N84-14028 #
UCRL-88670 ..... N84-13569 #
UCRL-88671 ..... N84-13471 #
UCRL-88682 ..... N84-13566 #
UCRL-88699 ..... N84-13528 #
UCRL-88760 ..... N84-14047 #
UCRL-88814 ..... N84-13553 #
UCRL-88857 ..... N84-13219 #
UCRL-88970 ..... N84-13543 #
UCRL-88987 ..... N84-13995 #
UCRL-89094 ..... N84-13512 #
UCRL-89188-REV-1 ..... N84-13339 #
UCRL-89189 ..... N84-13252 #
UCRL-89218 ..... N84-13436 #
UCRL-89262 ..... N84-13990 #
UCRL-89277 ..... N84-14009 #
UCRL-89299 ..... N84-13247 #
UCRL-89325 ..... N84-13279 #
UCRL-89328 ..... N84-13568 #
UCRL-89345 ..... N84-14015 #
UCRL-89356 ..... N84-13958 #
UCRL-89541 ..... N84-13972 #
UCRL-89593 ..... N84-13991 #
UCRL-89602 ..... N84-13849 #
UCRL-89651 ..... N84-13722 #
UCRL-89699 ..... N84-13918 #
UCRL-89706 ..... N84-13848 #
UCRL-89709 ..... N84-13588 #
UCRL-89712 ..... N84-13287 #
UCRL-89740 ..... N84-13810 #
UCRL-89746 ..... N84-13868 #
UCRL-89752 ..... N84-13902 #
UCRL-89756 ..... N84-13993 #
UCRL-89776 ..... N84-13992 #
UCRL-89862 ..... N84-14104 #
UCRL-89867 ..... N84-13557 #
UCRL-89881 ..... N84-13947 #
UCRL-89892 ..... N84-14106 #
UCRL-89922 ..... N84-13601 #

USAARL-83-13 ..... N84-13179 #

USAAVRADCOM-TM-83-A-1 ..... N84-13177* #

USAAVRADCOM-TR-83-E-1 ..... N84-13185 #

USAFA-TN-83-8 ..... N84-13215 #

USAFETAC/TN-83/001 ..... N84-13742 #

USGS-OFR-83-608 ..... N84-13716 #

WES/MP/EL-83-3 ..... N84-13505 #

W83-03727 ..... N84-13257 #
W83-03772 ..... N84-13394 #
W83-03778 ..... N84-13658 #

Y/DV-315 ..... N84-13280 #

☆ U.S. GOVERNMENT PRINTING OFFICE: 1984—421-564/404

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley
COLORADO
University of Colorado, Boulder
DISTRICT OF COLUMBIA
Library of Congress
GEORGIA
Georgia Institute of Technology, Atlanta
ILLINOIS
The John Crerar Library, Chicago
MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge
MISSOURI
Linda Hall Library, Kansas City
NEW YORK
Columbia University, New York
OKLAHOMA
University of Oklahoma, Bizzell Library
PENNSYLVANIA
Carnegie Library of Pittsburgh
WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an '*' following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library
COLORADO
Denver Public Library
CONNECTICUT
Hartford Public Library
MARYLAND
Enoch Pratt Free Library, Baltimore
MASSACHUSETTS
Boston Public Library
MICHIGAN
Detroit Public Library
MINNESOTA
Minneapolis Public Library and Information Center
NEW JERSEY
Trenton Public Library
NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library
OHIO
Akron Public Library
Cincinnati and Hamilton County Public Library
Cleveland Public Library
Dayton Public Library
Toledo and Lucas County Public Library
TEXAS
Dallas Public Library
Fort Worth Public Library
WASHINGTON
Seattle Public Library
WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols '#' and '*', from: ESA - Information Retrieval Service, European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

National Aeronautics and
Space Administration

Washington, D.C.
20546

Official Business
Penalty for Private Use, $300

SPECIAL FOURTH CLASS MAIL
Book

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451

U.S.MAIL

3 1 STAR, 840223 S01733HU
UNIV OF MICHIGAN
HARLAN HATCHER LIBRARY
DOCUMENTS UNIT SERIALS DIV
ANN ARBOR MI 48109

Undeliverable (Section 158
al Manual) Do Not Return